AMERICAN GAS

Association

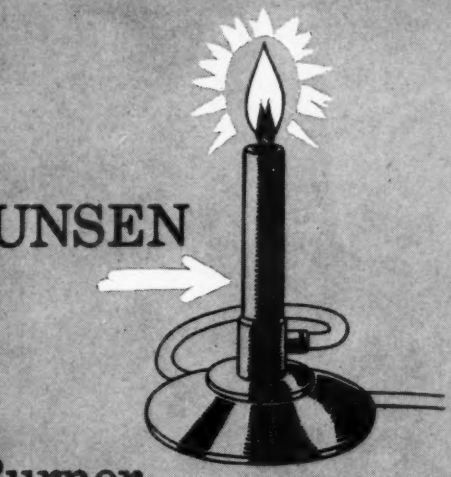
MONTHLY

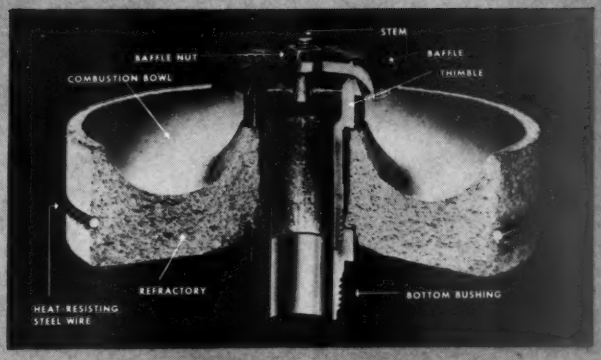
JANUARY 1945 • VOL. 27, NO. 1

Whether BUNSEN

or

"INFRA-RED" Burner





GAS is the SUPERIOR SOURCE of HEAT

From the solitary flame of a Bunsen burner heating the contents of a retort to great banks of "infra-red" ceramic burners for a complex drying operation—and for a wide variety of other applications, Gas is unsurpassed. There are many reasons why this is true.

For instance, Gas is automatically and precisely controllable. You can get the exact temperature you need, and maintain it as long as you wish. Gas is flexible and versatile—it readily fits into any production system. And Gas is economical—manufacturers report large savings in time, space and production costs after switching to modern Gas equipment. Gas is clean, too—it improves working conditions, so important to sustained labor efficiency.

Gas is progressive—equipment manufacturers, university laboratories and the American Gas Association are constantly making new advances through Gas research. Be sure your plant has all the benefits of industrial Gas—consult the Industrial Gas engineer of your local Gas company.

AMERICAN GAS ASSOCIATION
INDUSTRIAL AND COMMERCIAL GAS SECTION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

BUY WAR BONDS . . . HELP SPEED VICTORY!

• One of the ads in the national industrial and commercial gas campaign. It reached the chemical and metallurgical engineering field in December.

It was six years ago that this humble journal of gas industry progress appeared in a new dress and sallied forth to face its public. On the whole it was well received and that same dress has been continuously on view from month to month. . . . We feel that it served its purpose. It was different; it was not flashy, as befits a dignified old but nonetheless virile industry; it was space-saving; it was attractive in its own quiet way. . . . But, as in all things human, it had limitations. The use of fixed rules and heading style injected a certain rigidity. It lacked flexibility and free expression. It encouraged monotony in headline writing and tended to departmentalize articles. . . . So, upon advice of counsel, and even with a war on, we have discarded the old dress for the new. It isn't a Victory model (we hope) but something more durable. It is simple, flexible and readable. . . . Now that you have serious and logical reasons for a change, the truth is, the editor was just plain tired of the old style and needed something new and stimulating. We hope you'll like it and welcome your comment. . . . Happy New Year!

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JAMES M. BEALL, *Editor*

Gas Industry Advances in 1944

BY J FRENCH ROBINSON

President, American Gas Association

ALTHOUGH 1944 was a year of continued adjustment to an economy of war, the gas industry took stock, scanned its markets and formulated plans for the future. Noticeable throughout the industry was a determined effort to improve the economics of its operations and to expand certain basic activities so that the benefits of gas service may be realized to the fullest extent possible on the domestic, commercial and industrial fronts.

Statistical Summary

At the end of 1944, 19,775,000 customers, the largest number ever connected to the mains of the industry, were being served with gas. This was an increase of 2.0 per cent over the year 1943. Of this total, manufactured and mixed gas companies were serving 10,634,000 customers while 9,141,000 were served by natural gas companies.

Revenues of the entire industry aggregated $1,130,366,000, an increase of 5.7 per cent over 1943. Natural gas companies grossed $682,738,000, a gain of 6.1 per cent, whereas manufactured and mixed gas companies grossed $447,628,000, 5.1 per cent more than for 1943.

Industrial and commercial sales of natural gas increased by 52,664,000,000 cubic feet during the year, bringing total sales for 1944 to 1,182,544,000,000 cubic feet. This was a percentage increase of 4.7. Sales of manufactured and mixed gas for industrial and commercial purposes were 176,423,000,000 cubic feet, 5.2 per cent greater than for the previous year.

In the household uses of gas, such as cooking, refrigeration, house heating, water heating, etc., manufactured and mixed gas companies sold 306,765,000,000 cubic feet, a gain of 4.5 per cent. Gas consumed for house heating increased approximately 1.2 per cent. Sales of natural gas for domestic uses were 567,417,000,000 cubic feet, an increase of 10.6 per cent.

Indications are that the marketed production of natural gas in 1944, including amounts used in the manufacture of carbon black and for field purposes, will reach approximately three and two-thirds trillion cubic feet.

The outstanding development of the year was a thorough analysis of the industry and its varied problems made by the Postwar Planning Committee of the American Gas Association. This resulted in a plan adopted by the Association's Executive Board to carry out the committee's recommendations as to increased research, national advertising and general sales promotion calling for an expenditure of $1,400,000 annually for three years. At year end, subscriptions to this fund were mounting rapidly.

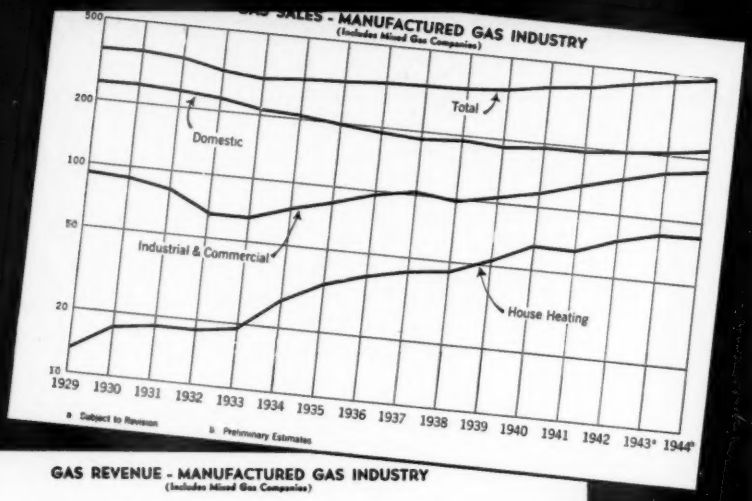
Accelerated Research

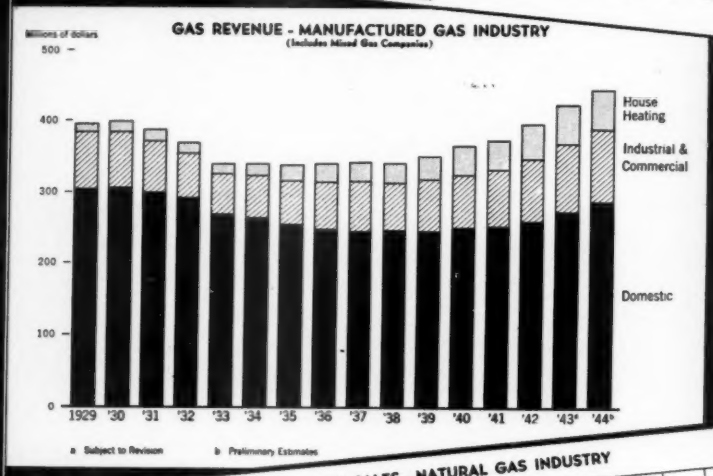
The year 1944 proved to be one of outstanding accomplishment for the Association's Testing Laboratories in Cleveland and Los Angeles. Appropriations for research were nearly three times higher than the annual average for the nine-year period from 1934 to 1942.

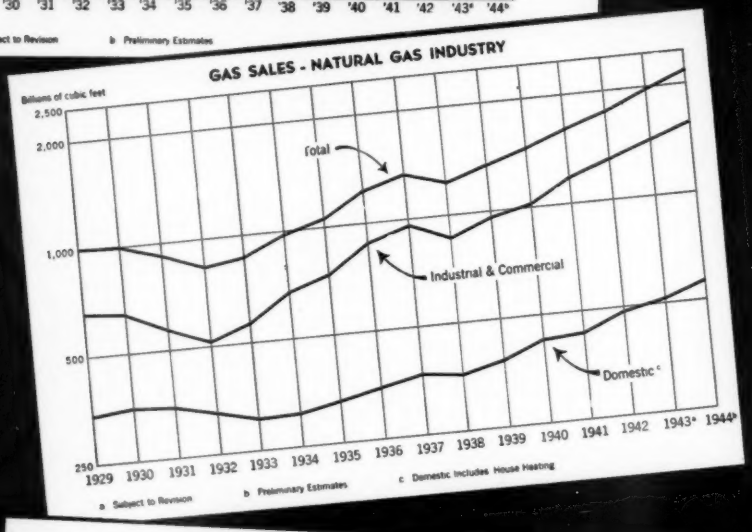
Although the major operating functions of the Laboratories continued to be development, design, engineering and testing of special war products for the War and Navy Departments and such Federal agencies as the Office of Scientific Research and Development, proper organization made it possible to inaugurate and carry out at the same time the most extensive fundamental research program in the industry's history.

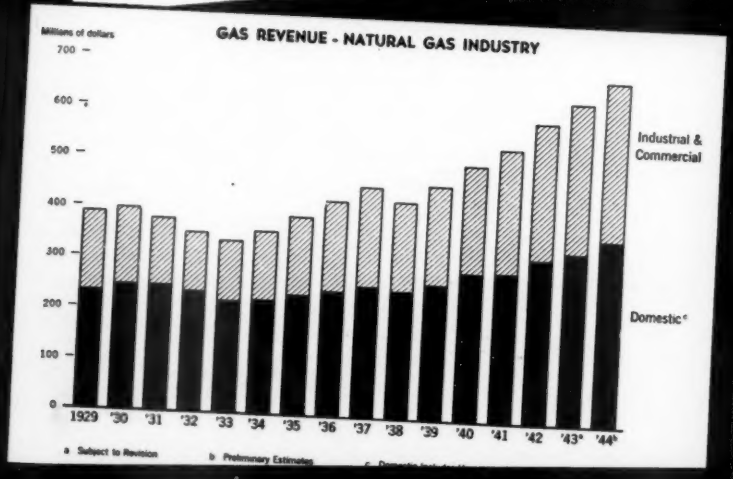
The accelerated research program contributed a wealth of material to design literature for the use of the industry. A solid foundation in domestic gas research was acquired for the future development of gas appliances to meet the

● **Opposite: This aerial crossing of the Brazos River in Texas shows one of the means used to carry the line of the Tennessee Gas and Transmission Company across the sixty-seven rivers and streams that cut its 1265-mile right-of-way between Corpus Christi, Texas, and Cornwell Station, West Virginia. The new $54,000,000 line delivers 200,000,000 cubic feet of gas daily.**


(Includes Mixed Gas Companies)
Total
Domestic
Industrial & Commercial
House Heating
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943ª 1944ᵇ
a Subject to Revision
b Preliminary Estimates


GAS REVENUE - MANUFACTURED GAS INDUSTRY
(Includes Mixed Gas Companies)
Millions of dollars
House Heating
Industrial & Commercial
Domestic
1929 '30 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42 '43ª '44ᵇ
a Subject to Revison
b Preliminary Estimates


GAS SALES - NATURAL GAS INDUSTRY
Billions of cubic feet
Total
Industrial & Commercial
Domestic ᶜ
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943ª 1944ᵇ
a Subject to Revison
b Preliminary Estimates
c Domestic Includes House Heating


GAS REVENUE - NATURAL GAS INDUSTRY
Millions of dollars
Industrial & Commercial
Domestic ᶜ
1929 '30 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42 '43ª '44ᵇ
a Subject to Revision
b Preliminary Estimates

demands of modern consumer markets.

Experimental development of a 100% primary air burner provided much fundamental data of wide interest, and while research is still in progress it is expected that smooth top range styling will be the eventual result of this new burner. Single point flash tube ignition for oven and broiler burners is another important development completed for practical application.

Special procedures were worked out successfully for testing gas appliances for use in sections of the country where high altitudes prevail. Exhaustive investigation and studies on domestic gas ranges, water heaters, space heaters and central heating appliances were worked out by the Laboratories and the National Bureau of Standards, Washington, D. C. The new approval requirements, when adopted, should benefit approximately 1,200,000 customers served by natural or by manufactured gas who live at elevations from 2000 to 7000 feet in the Rocky Mountain area.

With gas the predominant fuel in numerous housing projects constructed in all sections of the country, installation inspections rose to the highest in the Laboratories' history. Nearly 10,000 such visits were made during the year, many at the special request of government agencies.

Now completing its fourth year of operation, the Institute of Gas Technology is continuing its basic research activities without interruption. Two major projects in the field of gasification are attracting increasing interest. One involves the use of a highly superheated steam and fluidized pulverized coal. The other concerns a continuous gasification system under pressure using "atomized" coal produced by the Institute's newly developed coal pulverizer.

Natural Gas

During the year the natural gas industry met ever-increasing demands with a minimum use of men and materials.

A huge new gas line from Texas to West Virginia (of the Tennessee Gas and Transmission Company) started operating in October and is delivering more than 200 million cubic feet of

gas per day into the highly industrialized area in the Appalachian region, relieving a threatened gas shortage in that area.

A pipe line is being projected from Texas to California to supplement the natural gas supply to that state. A line in excess of 24 inches in diameter and 1000 miles long is contemplated for construction in 1945. Many looping projects have been constructed during the year to increase transmission facilities and augment the supply.

In addition to expansion of facilities, the industry has been mindful of its obligation in research and technical development. Important strides have been made in the further use of natural gas as a chemical agent and in its use for driving the gas turbine as a source of primary power. Substantial advances also have been made in the improvement of storage facilities and methods for storing natural gas in the ground.

Gas Kitchens of the Future

Inauguration of an industry-wide kitchen planning program sought for the first time to coordinate the efforts of manufacturers of kitchen cabinets with those of manufacturers of gas appliances to achieve unity of type, size and design. This cooperative plan is now in effect and has won the interest of related industries such as steel, glass, plastics, linoleum and others.

By means of such allied cooperation the gas industry proposes to simplify the acquisition of strictly modern gas kitchens for millions of homemakers. Gas utility companies generally have indicated their intention to promote such kitchens and the name "New Freedom Gas Kitchen" will be used extensively in national advertising scheduled for early in 1945.

National Advertising Developments

A change of pace in consumer advertising for the first six months of 1945 will consist of two closely integrated campaigns. One will feature the latest developments and trends in kitchen planning, spotlighting a certified performance gas range, a gas refrigerator and an automatic gas water heater. Magazines with a circulation in excess of 18,500,000 will be used.

MANUFACTURED GAS INDUSTRY*

	1944	1943	Per Cent Change
CUSTOMERS			
Domestic	9,797,000	9,635,000	+ 1.7
House Heating	399,000	393,000	+ 1.4
Industrial and Commercial	429,000	425,000	+ 0.9
Miscellaneous	9,000	9,000	—
Total	10,634,000	10,462,000	+ 1.6
Gas Sales (MCF)			
Domestic	221,648,000	209,458,000	+ 5.8
House Heating	85,117,000	84,112,000	+ 1.2
Industrial and Commercial	176,423,000	167,636,000	+ 5.2
Miscellaneous	4,057,000	3,852,000	+ 5.3
Total	487,245,000	465,058,000	+ 4.8
REVENUE (Dollars)			
Domestic	288,280,000	273,062,000	+ 5.6
House Heating	55,640,000	54,309,000	+ 2.4
Industrial and Commercial	101,318,000	96,207,000	+ 5.3
Miscellaneous	2,390,000	2,212,000	+ 8.0
Total	447,628,000	425,790,000	+ 5.1

* Includes mixed gas companies—Preliminary estimates by Statistical Department, American Gas Association.

NATURAL GAS INDUSTRY*

	1944	1943	Per Cent Change
CUSTOMERS			
Domestic (Incl. House Heating)	8,463,000	8,282,000	+ 2.2
Industrial and Commercial	676,000	649,000	+ 4.1
Miscellaneous	2,000	2,000	—
Total	9,141,000	8,933,000	+ 2.3
GAS SALES (MCF)			
Domestic (Incl. House Heating)	567,417,000	512,854,000	+10.6
Industrial and Commercial	1,182,544,000	1,129,880,000	+ 4.7
Electric Generation	388,604,000	299,553,000	+29.7
Total Commercial, Industrial and Electric Generation	*1,571,148,000*	*1,429,433,000*	+ 9.9
Miscellaneous	50,641,000	44,634,000	+13.5
Total	2,189,206,000	1,986,921,000	+10.2
REVENUE (Dollars)			
Domestic (Incl. House Heating)	362,952,000	338,328,000	+ 7.3
Industrial and Commercial	313,639,000	299,271,000	+ 4.8
Miscellaneous	6,147,000	5,773,000	+ 6.5
Total	682,738,000	643,372,000	+ 6.1

* Preliminary estimates by Statistical Department, American Gas Association.

COMBINED GAS INDUSTRY*

	1944	1943	Per Cent Change
CUSTOMERS			
Domestic (Incl. House Heating)	18,659,000	18,310,000	+ 1.9
Industrial and Commercial	1,105,000	1,074,000	+ 2.9
Miscellaneous	11,000	11,000	—
Total	19,775,000	19,395,000	+ 2.0
Gas Sales (MCF)			
Domestic (Incl. House Heating)	874,182,000	806,424,000	+ 8.4
Industrial and Commercial	1,747,571,000	1,597,069,000	+ 9.4
Miscellaneous	54,698,000	48,486,000	+12.8
Total	2,676,451,000	2,451,979,000	+ 9.2
REVENUE (Dollars)			
Domestic (Incl. House Heating)	706,872,000	665,699,000	+ 6.2
Industrial and Commercial	414,957,000	395,478,000	+ 4.9
Miscellaneous	8,537,000	7,985,000	+ 6.9
Total	1,130,366,000	1,069,162,000	+ 5.7

* Preliminary estimates by Statistical Department, American Gas Association.

The second campaign will give separate featuring to gas house heating and year-round air conditioning. Magazines having a circulation of 8,430,716 will be used.

An enlarged national campaign of industrial and commercial advertising was initiated in September, 1944, in trade, technical and business magazines. Nineteen publications carrying this advertising reach many varied fields and cover the food industries where gas is widely used in processing, the chemical and metallurgical fields where new development is constantly going on with many new opportunities for gas, the school fields and the general industrial field as well as business media.

Gas Fuel and War Materiel

Gas fuel for industrial heating purposes continues to be used at peak levels with some shifting as demands for various munitions and war products themselves change from time to time. Thus airplane production in certain classes has been reduced because losses have been less than anticipated, and consequently there have been certain cut-backs in such plants. Contrariwise, demand for heavy ammunition and guns has increased to such an extent that peaks of industrial gas demands have again reached new heights.

The magnitude of operations for war is so great today that it is natural to look first at those applications of gas which are, in themselves, large and striking. However, it is not only the big jobs which demand attention, but the many small ones as well, particularly when they lead to improvements in process or quality or permit reductions in cost of manufacture or accelerate speed of production.

To cite an example, equipment competitive to the gas industry produced excellent results in speedier heat treatment of various items such as shell noses, gears, etc., and this led to a research program which has now culminated in the direction of high-speed gas heating units that not only duplicate but exceed the performance previously reported in these important fields. In fact, so rapid has heating become that it will be necessary to change standards of performance published in guides and handbooks which, in many cases, intimated that metals could not tolerate, without cracking, heating speeds now accepted as commonplace.

Postwar Significance

The significance of such achievements is not merely measured in terms of greater war output or lower cost of munitions. It must be analyzed in terms of eventual civilian use, and it requires no great stretch of the imagination to appreciate how faster speeds, lower costs, and far better metallurgical control will be of prime importance in the production of automobiles, refrigerators, radios, and the other peacetime goods now unavailable. Thus, the gas industry not only has pioneer radical changes in methods of manufacture of a wide variety of parts but is also laying the foundation for permanent industrial gas loads in the future.

The urgency of war needs has sometimes led to the adoption of the most available fast procedures, even in the sacrifice of production costs and without regard to the investment required. Fortunately, this situation does not arise very easily in the case of industrial gas equipment which has the necessary flexibility to permit its conversion to peace use at a minimum expense, after which the economic advantage and flexibility of gas use will be immediately available to civilian production.

Industrial Gas Strides

Heating parts undergoing treatment by means of hot air up to 1000° F. in so-called "convection" furnaces have been common practice in the past, but today this field has been extended to temperatures as high as 1750° F. This represents heats which formerly were thought to be the exclusive field of radiant heat transfer, but the great strides made in metals which can withstand high temperatures make possible the extension of air heaters. Similar progress in metals has brought to the foreground the ultimate economies obtainable by gas combustion turbines, and these have been widely discussed by technical sources during the year.

The quenching of metals after heat treatment in oil and water is common knowledge, but today the use of special gas atmospheres discharging from high velocity gas jets as a means for controlled quenching for superior properties is a rapidly growing innovation and a new field of usefulness for gas. In an analogous manner, gas fuel has been applied to the pickling of steel, eliminating the older acid baths and carrying out the entire process in a dry gas atmosphere.

Industry has generally taken advantage of war needs to modernize production equipment to such an extent that the termination of World War II will see American industry equipped with the latest and best means of production of any available in the world today. The gas industry is justifiably proud of the many contributions it has made toward the achievement of

(Continued on page 52)

GAS INDUSTRY FUND GROWING

SUBSTANTIAL progress has been made in the campaign to raise $1,400,000 for the gas industry's Research and Development Plan. At this date (January 2) $1,000,000 has been subscribed. Subscriptions have come from every branch of the industry and the appliance and equipment manufacturers are making good progress toward their goal of $200,000 for the enlarged National Advertising Program. With the cooperation of the Canadian Gas Association, a number of Canadian companies are arranging to support the Plan.

If you have not already done so, send in your pledge now! February 1, 1945 is the deadline which has been set for beginning operations. There is not much time left. The special committee appointed to raise the funds is counting the days and is counting on every company's subscribing.

Clinton B. Folkrod investigating the fundamentals of storing natural gas as a hydrate.

Institute Research in 1945

Full force of well-organized technical laboratories turned on vital fundamental manufactured and natural gas problems

J. I. Yellott

BY J. I. YELLOTT

Director, Institute of Gas Technology, Chicago, Ill.

THE Institute of Gas Technology in 1945 will enter upon its fourth year of existence. Founded in the Spring of 1941 as an independent educational and research agency, it has grown steadily and, during the coming year, will take an increasingly important place in the industry.

Of the objectives for which the Institute was established, only one has become a temporary casualty of the war. The educational program, after reaching a peak with 22 students in the Spring of 1944, was discontinued when changes in Selective Service regulations eliminated deferment for educational students. The Fellows are scattered literally to the four corners of the world, but most of them hope to return and complete their education after the war. Three advanced degrees were won before the program was suspended, and one man is on his way to the Degree of Doctor of Philosophy. Although the educational program is unlikely to be resumed in 1945, it will certainly get under way just as soon as the war will permit the resumption of graduate study, so that the industry may look forward to acquiring a group of well-trained and enthusiastic recruits.

For the duration, and particularly in 1945, research for the gas industry will occupy virtually all of the Institute's facilities and resources. The research program has two major divisions, the first being devoted to problems which are sponsored by individual member companies. The second is the Institute's basic research program which is financed by its own funds.

Sponsored research projects are invariably confidential and the results are communicated only to the sponsor. The amount of sponsored research is increasing steadily and ten such projects are now under way. Approximately $150,000 will be expended on these projects during the coming year.

Basic Research Expanded

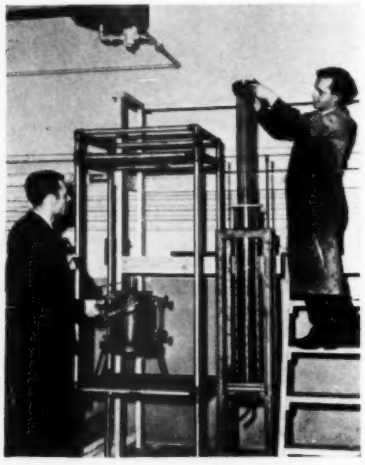
The program of basic research is in turn divided into two main classifications, covering manufactured and natural gas projects. In the field of manufactured gas production, a comprehensive research program was initiated in the Spring of 1944, and is now being pushed ahead vigorously. Manufactured gas research is primarily directed towards the development of low cost gas production equipment for peak load operation, and is being carried out with the house heating load as the primary objective. The work in natural gas is also going forward, but on a somewhat smaller scale.

During the latter part of 1944, the Institute was authorized to conduct extensive literature studies for the A. G. A. for the purpose of coordinating current knowledge in a number of different phases of gas production. These reports will be released during the coming year under the auspices of the Postwar Planning Committee.

The Institute feels that, at many locations, the best immediate solution to the house heating load will involve the generation of enriched blue gas from propane, since proven processes for this service have already been developed and are in use in several other industries. Study of the fuel situation

indicates that heavier hydrocarbons are likely to be particularly well suited to the needs of the manufactured gas industry, both in price and in availability. Consequently, work will be carried out to see whether present methods of gasification can be applied to these products as well as to the lighter materials.

The Institute has submitted a comprehensive research program to the Gas Production Research Committee, and included among those recommendations are suggestions for the study of several proposed continuous processes for complete gasification of coal, coke and heavy oils. The Institute expects to work in this direction during the coming year. The development of a novel method of "atomizing" coal and coke has given added interest to processes for the gasification of pulverized materials. Such a process, called "Flash Gasification," is now being studied on a laboratory scale and it is hoped that a small pilot plant can be established during 1945. The study of foreign gasification processes has led to the conclusion that most of those successfully in use at the present time are being applied to base load operations, such as the generation of synthesis gas for the production of motor fuels, etc. These plants do not seem to be the answer to the American peak load problem but several valuable lessons can be learned from them. The use of oxygen for internal heating is common in Europe, and war-time advances in oxygen production equipment will apparently reduce its cost to an attractive figure.



Fluidized gasification of pulverized coal will be studied in this apparatus by Dr. J. J. Sebastian and George Von Fredersdorff of Institute's staff.

The use of pressures higher than atmospheric in gas generation has been shown to have valuable effects both in improving the quality of gas and in reducing the cost and size of the equipment. The Institute expects to work in this field also during 1945.

The technique known as fluidization, by which finely pulverized materials are caused to undergo reactions with gases, has been developed to a very high degree by the oil industry. Fluidization appears to have a number of excellent applications in the gas industry and the Institute expects to work both on the fundamental theory of the process and on its applications. As one example, it has been found that coal can be devolatilized at relatively low temperature by the fluidization process, and a char can be produced which can enter directly into gas production, or which can be made into a good high temperature coke.

Fischer-Tropsch Process

Much attention has been paid in the past year to the Fischer-Tropsch Process, by which Germany has been able to produce most of her fuel requirements. The Institute has been actively investigating this process, because of its possible application both to manufactured and natural gas. It is claimed by some that gasoline will be produced from natural gas by the Fischer-Tropsch Process in the near future, although the economic phases of this process appear at present to need further study. The manufactured gas industry can also supply the synthesis gas which is required by the Fischer-Tropsch Process, but, once again, the economics of this application do not now appear to be favorable.

Catalytic upgrading of blue gas will be studied with the intention of developing a sulfur resistant catalyst. Previous work by Dr. J. J. Sebastian, co-supervisor of the Institute's Coal and Gasification Section, indicates that molybdenum disulfide has excellent possibilities as a catalyst since laboratory tests indicate that it will have both long life and good resistance to sulfur poisoning. Catalytic upgrading offers possibilities both in the production of a high B.t.u. gas without oil enrichment and the utilization of blue gas as a raw material for chemical production.

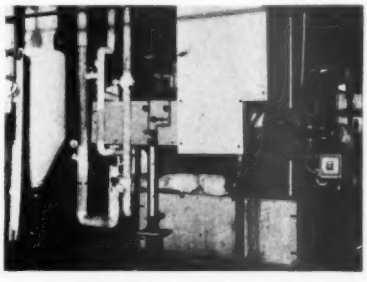
The Organic Sulfur project is the Institute's oldest, and this will be pushed forward vigorously during 1945 as a joint project with the Organic Sulfur Subcommittee of the American Gas Association.

One of the most interesting developments during 1944 was the invention of the new continuous method of pulverizing coal, coke, oil shale and other minerals through the use of steam. This pulverizer is likely to find application in many uses where the exhaust steam is needed for a process, such as gasification. Because of its low cost and simplicity, this pulverizer is likely to play an important part in the Institute's gasification research.

Natural Gas Projects

In the field of natural gas, work is being carried out on hydrates, with the intention of developing a practical method of storing gas in this form. Fundamental information has already been gained on the composition of several hydrates and work is now being directed towards the finding of a suitable carrying medium.

The utilization of propane is also being studied, with the intention of increasing its value by the development of new processes for using it as a chemical raw material. Work will also be done during the coming year on the application of propane as a raw material in water gas manufacture for peak load plants.



The Gas Institute's "Coal Atomizer" will be used in research on gasification processes.

The Staff of the Institute now num-

(Continued on page 50)

War Load to Heating Load?

Natural gas companies with large wartime industrial loads and underground storage facilities can look to house heating to take up slack

D. P. Hartson

BY D. P. HARTSON

Vice-President and General Manager, Equitable Gas Co., Pittsburgh, Pa.

RECONVERSION from a war to peacetime economy will bring vexing problems to many industries. While we in the gas industry are fortunate that we have a large and relatively stable domestic gas business and will not have to face the problem of complete plant conversion, nonetheless we will have pressing problems to consider. In particular those companies operating in highly industrialized areas and with greatly expanded war loads, will have to cast about for new business to absorb their geared up production and distribution capacity.

Fertile Field of House Heating

Can we count on increased house heating load to fill this gap? For those natural gas companies operating under the following conditions, I am convinced the answer is "yes":

(1) A substantial increase in industrial sales due to the war, with expectation that these increased deliveries will be discontinued shortly after V-day.

(2) Sufficient underground storage capacity has been discovered and developed to carry the usual winter demands of domestic customers plus the increase in industrial sales mentioned in condition No. 1.

(3) The company has sufficient transmission and distribution capacity to permit substantial increases in deliveries to heating customers without requiring too large an additional investment.

First, let us review some of the fundamental reasons why underground storage has brought about a revision of the attitude of many natural gas companies regarding sales of gas for house heating.

The usual reasons for gas storage are, first, to make possible the production of gas, either manufactured or natural, at a higher load factor than that of its utilization, and second, to save the necessity for the installation of additional transmission or distribution capacity from the source of gas to the approximate point of usage.

Underground storage pools situated near the market accomplish both of these objectives. Natural gas may be produced from low capacity wells the year 'round. In summer the gas can be placed in underground storage pools of high delivery ability for use to supply the peak demands of the heating season. Gas wells, especially older ones, can be kept in line full time and their maximum annual potential production realized. Gas stored at or near the markets can be utilized during emergencies and periods of peak demand with a great saving in transmission capacity.

Gas Supply Problems

Because of the many advantages of natural gas as a fuel for automatic house heating and its low therm cost, it is used in many localities for this purpose. Since the amount of gas used is largely dependent upon the weather, the daily gas requirements of a company having a large number of house heating customers varies widely. Production and delivery capacity must be adequate to meet all of the requirements of the day of peak demand, which is usually the coldest day of the year. The demands of that one day may greatly exceed those of the average daily delivery. The supply problems brought about by such relatively low daily load factor sales in the past have prevented many natural gas companies from encouraging the use of natural gas as a house heating fuel.

Fortunately, the increased use of underground storage pools to a large degree has eliminated the "headaches" of the supply and delivery characteristics of a house heating load. At present, in almost every case, most large natural gas utilities have carried and are still carrying greatly increased industrial sales loads due to war demands. The existing building heating load with its high hourly peak demands and low daily load factor is also being carried very satisfactorily, thanks to underground storage.

Underground Storage Development

Most of the underground storage pools now in use were developed just prior to or during the present war. Many of them were not available under peacetime operating conditions. The purpose of this article is to consider the opportunities which these recently developed storage facilities may offer for the development of new markets in the postwar period.

Take as an example, Company "A." Prior to the war this company had an industrial load averaging approximately 30 million cubic feet per day. This gas was sold at a daily load factor of approximately 80%. This company now has a daily industrial load of approximately 55 million cubic feet per day,—25 million cubic feet greater than it enjoyed prior to the war and this gas is being sold at approximately 100% load factor throughout the year. In addition to these greatly increased industrial sales, the company also carries its usual load including a considerable amount of gas used for building heating. Such an accomplishment, as in the case of many other natural

gas companies, has been possible only through the extensive use of underground storage involving almost continuous use of gas from storage from the first of November to the end of April, and the replacement of storage gas from May to November of each year.

What is going to be the postwar situation? Much if not all of the added wartime industrial load will be lost. To the production and transportation employees this probably will come as a distinct relief after several years of near 100% capacity operation. The opportunity to overhaul thoroughly and recondition compressing equipment and pipe lines will be decidedly welcome. What a relief it will be to get back to "normal" operating conditions again and to be relieved of this 24-hour, 365-day-a-year drive to maintain capacity deliveries!

How about revenues in the postwar situation? Can we go back to "normal" or pre-war revenues? The loss of wartime industrial sales will naturally mean a corresponding loss of revenues. One would indeed be foolish to predict that operating costs will return to pre-war levels. History indicates otherwise. The cost-of-living index may take a temporary dip some time after V-day but don't expect the curve to continue downward, long. The chances are that it will recover and may turn upward again. Labor costs may well be expected to stay up. The prospects for other expenses are the same. There is little hope that we can go back to pre-war levels of operating expenses.

There seems to be but one answer to the problem of reduced revenues and continued high level of increased expenses, and that answer is increased sales for new uses. A shrinking industrial load leaves only one major type of new business and that is in the heating market. Naturally, every effort must be made to retain the cooking and water heating loads against the inroads of competition. But, what about the heating market? Only a few natural gas companies have a high saturation of this load. Before the development of underground gas storage, the building heating load was not universally sought after and in some cases it was actually discouraged.

The postwar planning activities of the American Gas Association are pointing the way for any company endeavoring to hold its basic cooking and water heating loads. The Research and National Advertising activities of the Association are setting the stage for intensive and effective local action. The best defense has always been said to be good offensive action. If we are really "going after" the sale of quality gas appliances and new gas load, wherever available, with the aid of "tools" and guidance provided by the Association, we do not need to be afraid of competition.

Let's get back to our Company "A." In the postwar period it will lose much of its wartime industrial load, but it is believed that to a large extent it will be possible to replace these industrial losses through new sales of gas for house heating.

For each million cubic feet of delivery ability made available through the loss of industrial load it is calculated that 500 residential house heating installations of the average size for this company's territory could be supplied and that these new installations would use a total of approximately 91 million cubic feet per year. At an average rate of 55.6c per MCF for this heating gas an added gross revenue of $50,600 would be available. The same million cubic feet per day capacity under wartime conditions when sold to an industrial customer would mean, let's say, sales of approximately 345 million cubic feet. At an average sales price of 34c per MCF a gross revenue of $117,000 is now being obtained.

On the basis of gross revenue, obvi-

Air Conditioning A Century Ago

● The following extract in Co-Partners' Magazine, published by The Liverpool Gas Company, is from *Illustrations of the Theory and Practice of Ventilation* by David Boswell Reid, M.D., F.R.S.E., published in 1844:—

"Some years ago, about 50 members of one of the Royal Society Clubs at Edinburgh dined in an apartment I had constructed where, though illuminated by gas, the products of combustion were essentially excluded. Large quantities of a mild atmosphere were constantly supplied, and passed in quick succession through the apartment throughout the whole evening, the effect being varied from time to time by infusing odoriferous materials, so that the air should imitate successively that of a lavender field, or an orange grove, etc. Nothing very special was noticed during the time of dinner by the members, but Mr. Barry, of the British Hotel, who provided the dinner, and who, from the members of this club being frequently in the habit of dining at his rooms, was familiar with their constitutions, showed the committee that three times the amount of wines had been taken that was usually consumed by the same party in a room lighted by gas, but not ventilated—that he had been surprised to observe that gentlemen whose usual allowance was two glasses, took without hesitation, as much as half a bottle—that those who were in the habit of taking half a bottle, took a bottle and a half, and that, in short, he had been compelled twice to send hackney-coaches for additional supplies during dinner, though he had provided a larger supply than usual. Minute inquiries afterwards assured me that no headache or other injurious consequence had followed this meeting, nor was any of the members aware, at the moment, that they had partaken more heartily than usual till Mr. Barry showed them what had taken place. . . . .

"Though the illustration cited is important, the facts . . . . are entirely in unison with the statements made by manufacturers, whose men are reported to have struck for wages where a good system of ventilation had been introduced, as their former wages were insufficient to procure them the increased amount of food which their appetites now demanded.

"No argument indeed is more common against ventilation than the expensive appetite it maintains. Nowhere is it seen more distinctly than in numbers of refreshment rooms. The profits, in numerous such rooms, would diminish largely were they well ventilated, and were the appetite equally satisfied at the same time. Unquestionably, the proprietor of ill-ventilated refreshment rooms has no right to charge at the same rate as those that have their apartments well ventilated.

"In the same manner, when a house has been well ventilated, the expense of wine and refreshment is generally considerably increased; and a fete given in an ill-ventilated apartment, crowded to suffocation and saturated with moisture, is very economical in general, compared with that which has to be provided in a flowing atmosphere."

ously we cannot realize the same amounts from use of our million cubic feet per day capacity. But how will the remaining revenues compare after taking the cost of the gas into consideration? Let's consider a few figures.

Use of 1000 MCF Per Day Capacity for Supplying Wartime Industrial Load	
Annual Sales	345,000 MCF
Gross Revenue @ 34¢/MCF	$117,000
*Incremental Cost of Gas @ 28¢/MCF	96,500
Available for other expenses and return on investment	$ 20,500
Use of 1000 MCF Per Day Capacity for Supplying Typical Residential Heating Installation	
Annual Sales	91,000 MCF
Gross Revenue @ 55.6¢/MCF	$50,600
*Incremental Cost of Gas @ 32¢/MCF	29,100
Available for other expenses and return on investment	$ 21,500

* Incremental cost of residential house heating gas is estimated at 4¢/MCF more than that used for wartime industrial uses due to part of the gas used for house-heating sales being stored. This cost will probably vary widely between different companies. For some situations the allowance of 4¢/MCF sold for househeating, to cover the cost of storage, will be high. Not all of the gas sold for this purpose need ordinarily be taken from storage, but can be considered winter base load.

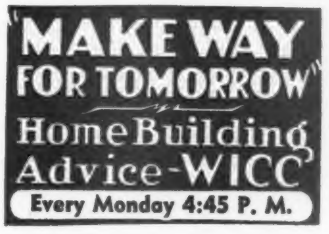
If we assume that other operating expenses will remain at about the same level whether the gas is sold for industrial purposes or for residential house heating, then we have available for meeting these expenses and providing some return for each million cubic feet per day capacity of wartime industrial load:

Wartime industrial sales to be lost after V-day	$20,500
New residential house heating sales	21,500

Probably Company "A" would find it impossible to develop an additional 25 million cubic feet per day of heating load in a short space of time even if such an accomplishment could be considered desirable. To build up such a very sizeable house heating load would normally require a number of years of effort. The purpose of this discussion is to point out the revenue building possibilities of new residential heating load where the loss of heavy wartime industrial sales is imminent. The use of underground storage makes the possibility of greatly expanded sales to the heating market very interesting.

Of course, the costs of gas and the sales prices vary with different localities, and it is realized that the figures used here will apply in but few cases. The management of each company should give careful consideration to such questions as, "Are we planning to put wartime capacity to the best use in the postwar period?" "Can we replace the 'lost' wartime industrial load with sales of gas in heating field?" For those companies who have developed substantial underground storage capacity, there appears to be an attractive prospect for building up a heating load which will tend to offset increased operating expenses and decreased earnings which will come with V-day.

BRIDGEPORT RADIO PROGRAM PREPARES WAY FOR POSTWAR BUSINESS



Teaser ads promote program.

A JOINT radio program sponsored by Bridgeport's largest lumber firm, the largest savings bank in the area and the Bridgeport Gas Light Company is steadily gaining listeners. Using the title "Make Way for Tomorrow," the program through dialogue, reports on the new developments and new materials that will be available for homes after the war. At the same time the fantastic dreams of free lance designers are thoroughly debunked.

Commercial plugs for the three sponsors are kept at a minimum although the "lead in" usually runs "Make way for tomorrow—for the magic gas flame, et cetera."

Recently women listeners were invited to send in ideas for postwar kitchens. Some typical suggestions are given below.

Daily and Sunday newspaper single column "ads" are used to promote the program by the three sponsors.

Frequently a guest is interviewed by "Lew and Flo" to bring in added interest. Some of the women who sent in kitchen ideas were interviewed. The script is sometimes devoted to clearing up an important point about home building such as the mechanic's lien. Gas air-conditioning made an ideal subject on several programs for it typifies a new home development that can be definitely promised.

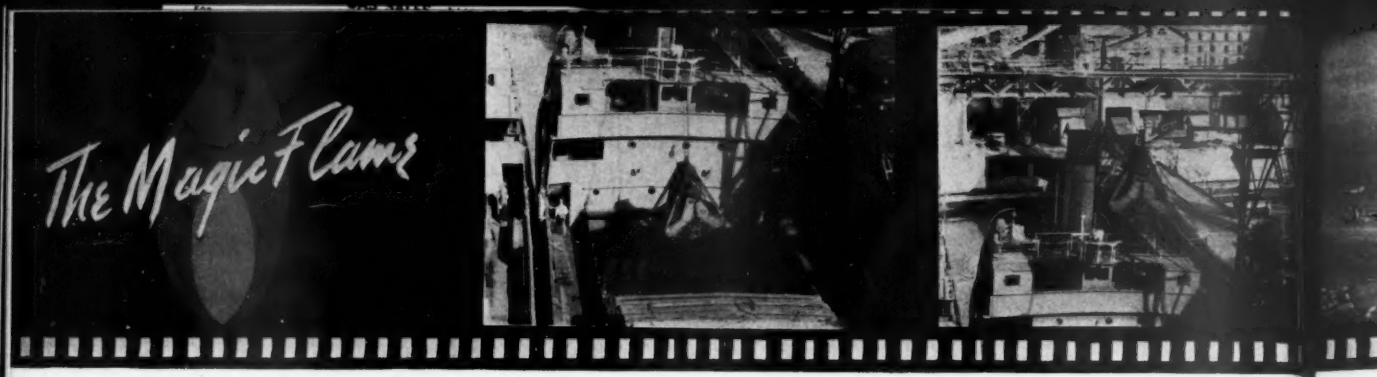
The Bridgeport-Peoples Savings Bank, one of the sponsors, has started a homeowners saving club for financing postwar homes. The bank, the second largest savings institution in the State declares that the project is a real success.

The A. W. Burritt Lumber Company has for years been a community leader in encouraging the building of properly constructed homes. Together with the gas company, these three strong institutions make a combination that presents a broad appeal to the listening audience interested in new postwar homes. Plans for carrying this influence beyond radio are already underway.

Florence Robinson (Flo) and Lewis Dearborn (Lew), of the "Make Way for Tomorrow" radio team, getting information for the Bridgeport program at the U. S. Rubber Company's exhibit.

POSTWAR KITCHEN IDEAS FROM THE RADIO AUDIENCE

Built-in pantry with sliding panel door—saving room space.
Non-skid kitchen floor.
Foldaway stool near sink.
Noiseless doors to prevent slamming.
Higher sinks to overcome back strain.
Built-in window box for flowers.
Dish towel dryer.
Built-in vegetable bin under sink.
(The need for kitchen ventilators was frequently mentioned.)



Gas Stars in Australian Films

While handicapped because of war restrictions, gas firms in Sydney metropolitan area tell story of "Magic Flame" in two well-produced movies

DESPITE the fact that Australia has been fighting World War II in its own back yard, so to speak, its gas companies have found time and energy to promote aggressively the use of gas for postwar home and industry. Typical of the Australian gas industry's forthright approach to the postwar sales task is the action of The Australian Gas Light Company, Sydney, in preparing two short sound films for showing in public theatres.

The films already completed are entitled "The Magic Flame" and "A House Is Built." These tie in with the main title and theme of the American Gas Association's present national advertising program. According to H. Tindale, general manager of the Australian company, these films compare favorably with the best short publicity films shown in Sydney.

"The Magic Flame" was exhibited in September in six theatres weekly in the Sydney metropolitan area on a circuit of more than 100 theatres. "A House Is Built" was to follow by a few days on the same circuit. A third film is under consideration and still more are contemplated.

Motion picture theatres in Sydney, except under special circumstances, restrict advertising films to approximately 200 feet in length and invariably screen them immediately after the mid-program interval.

The accompanying illustrations show some of the "stills" from the films. The commentary and list of "shots" which follow give some conception of the ideas and treatment adopted.

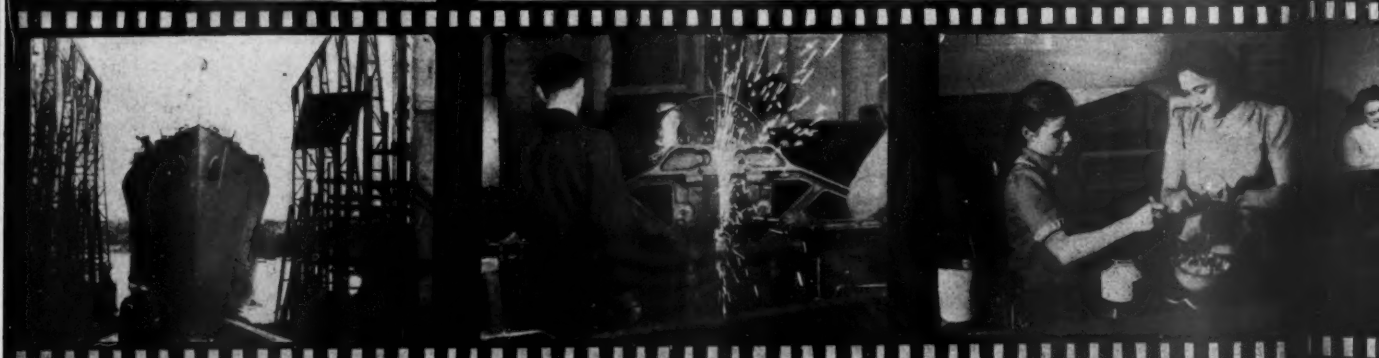
"THE MAGIC FLAME"
A Forecast for the Future

Sub-Title: "The Magic Flame" is a powerful force in the fight for Victory—a force that will lighten and brighten your future.

Commentary:

There is perhaps no mineral so valuable to every day comfort and personal well-being as the lustrous black substance we know as coal. There is no process in which its heating and chemical content is so fully exploited as in the creation of the "the magic flame." In the manufacture of gas almost every particle of heat in the coal and almost every chemical element of commercial value are extracted. Many important by-products are recovered—coke, fuel oil, motor spirit, road tars and the bases for powerful explosives, antiseptics and drugs. Gas—the faithful servant for over a century—plays an important part in the production of ships, guns, planes and tanks.

On the food front fertilizer produced in the gas plant helps the farmer to grow bigger and better crops. In the home the housewife enjoys automatic cooking, sunlike warmth, silent refrigeration and hot water appliances that serve right round the clock. There



is nothing like the convenience of modern gas appliances. Nothing like them for comfort, smartness and unrivalled economy.

The gas industry is making a vital contribution to the war effort but it is also planning for times of peace. Whether you intend modernizing your present home or plan to build a new one after the war, the all-gas home will be the home to live in. Postwar cooking and heating appliances will possess new style and new smartness—they will brighten and lighten the days in every home.

SCENES AND SEQUENCES:

Gas Plant: Bucket grab unloading coal from ship on to conveyor belt. Coal on conveyor belt moving into Works. Moving shot embracing Retort Houses, coke plant, purifiers and holders.

Industrial: Aluminum ingots passing through gas furnace.

Ships: Warships at sea.

Planes: Bombers flying in formation.

Tanks: Field scene of tanks in action.

Tractor Ploughing Field: This shot tells the other side of the story for gas—By-Products. Fertilizers such as Sulphate of Ammonia are used extensively in cultivation of crops which in turn play a big part on the food front. This leads into the domestic side of the film.

Domestic: Housewife preparing meal in streamlined kitchen showing a modern refrigerator, hot water service and range.

Drawing Office: Draughtsman at board explaining to the housewife who is examining a small model representing a proposed gas range for the home of tomorrow.

Modern Homes: A few close-up glimpses of ultra-modern homes.

Final Shot: Converging view of the All-Gas Home poster on hoarding.

"A HOUSE IS BUILT"
A Thought for Tomorrow

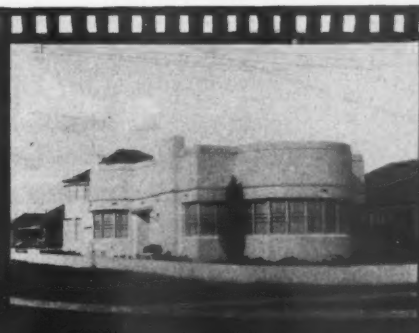
Sub-Title: TODAY we are working for Victory with the aim that those things we plan for tomorrow may come true.

Commentary:

From far-flung battlefronts news of Allied successes reaches us almost hourly—successes made possible by magnificent fighting men, mighty weapons of war, capable leadership and efficiently maintained lines of supply. Almost every conceivable kind of material is needed by the Allied nations to wage this global war—this struggle for survival—consequently that snug little cottage you wish to build or that old-fashioned home you intend to modernize must wait until final victory is won.

Into this mightly struggle the manufacturers of gas appliances have thrown their great productive energy and manufacturing resources but whilst thus fighting for victory they are also planning for the day of peace—planning better and finer gas appliances for the homes of tomorrow—homes that will possess new style and beauty and provide a standard of comfort never before believed possible.

For more than a century gas has served the people faithfully and although times have changed and there have been far-reaching improvements in the style and design of homes, gas still renders the same unfailing service—still offers the same straightforward, satisfying results. Therefore, if you want to enjoy the comfort and smartness of a really modern home, specify an All Gas Home. Cooking on an automatic gas range is a sheer joy . . . . the gas refrigerator (which is perfectly silent) gives a new meaning to food preservation . . . . you get an instant and copious supply of really hot water when gas does the heating, and you



have warmth to your order when you use a modern gas fire in your home.

War Scenes: Tanks racing across the desert. Sailors on ship firing Tommy Gun at attacking aircraft.

Shipyard: Ship being launched, symbolic of supply line to forces overseas.

Timber: Loaded trucks leaving Timber Mill. Emphasizing materials used in normal times—now diverted to war purposes.

Bricks: Close-up of bricklaying.

Gas Appliance Factories: Showing machinery used for gas appliance manufacture now diverted to meet the requirements of the fighting forces, oil drum making, cooking equipment and utensils. (Rheem & Metters)

Gas Works: Bird's-eye view of Holders. Gas service tie-up with the series of homes in following scenes.

Homes 1908, 1918, 1938: Showing the progress in home-planning over the past 40 years and tying up with modern gas appliances.

Bathroom: Boy playing in bath of hot water.

Kitchen: Mother and young daughter making cakes—boy helping himself to fruit from refrigerator.

Lounge Room: Family group enjoying the glowing warmth of a gas fire.

Young Couple: Young couple seated at table—with illustrated journals, looking for ideas for their post-war home.

Modern Home: Moving shot of typical model home.

Poster: Converging view of gas poster on hoarding—the fadeout shot.

Hot Ice

● The clean blue gas flame is used not only for making ice cubes but is being utilized commercially in Chicago and other cities to heat water for cutting large slabs of ice into tiny cubes. When heated to a temperature of about 185 degrees, the water is shot through thin metal tubes. Like a hot knife slipping through a tub of butter, the tubes now heated by the water quickly slice the huge blocks of ice into shapely little cubes. Formerly achieved by sawing, this new method is not only more efficient but is labor-saving too. In one plant about two tons of cubes are bundled into sacks every hour for delivery to restaurants, taverns and night clubs where they eventually wind up in a tall glass with other ingredients.

A. W. Beck introduces a group to the inner workings of a gas refrigerator.

Training For Domestic Gas Service

Background and technique of Southern California's program to meet demand for trained servicemen today

This material was prepared by the Employee Training Staff and the Publications Department of the Southern California Gas Company. It is amplified from an article which originally appeared in a recent issue of Gas Newsweek Pictorial, employee magazine of that company.

THE training experiences of the Southern California Gas Company in regard to service training have been similar to that of other companies in that it has paced the transition from the "gas man" to the present-day, well-trained and equipped serviceman. The company's present program has developed over a period of some ten years and, in order to understand the present training effort, it is necessary to review briefly some of the training techniques that have been employed in the past.

Initially, an attempt was made to assure the trainee experience in many fields of the gas business, by adopting the apprenticeship principle. Those programs usually consisted of assigning promising employees to various jobs which usually included experience in main and service work, appliance repair and meter repair. This was considered the first major step in the training program because it was the first attempt to control the experience of new employees with a definite end result in view. That type of training gave the new employee a useful background, but the progress towards his ultimate assignment was slow because instruction for his future work was still secondary to keeping him productive during the training period. The necessity for quick replacements and complications resulting from the numerous departments involved made that type of training impractical.

A system which might be termed "working with an expert" was later

developed to correct the faults of the previous method. By assigning trainees as "helpers" to these old-time "experts," an attempt was made to capitalize on the store of knowledge contained within that group. However, it was readily evident that these individual "experts" had work habits which were not always desirable to pass on to the new trainee. It was also learned that well-qualified workmen were not necessarily good instructors, and the quantity and quality of instruction given individual students varied widely.

Efforts to remedy that situation resulted in the development of a formal training program. Well-qualified instructors were introduced at this point to supplement the limitations of the workmen, who continued to give field instruction. These early instructors, who formed the nucleus of the present specialized training group, introduced various props, such as cut-a-way fittings, appliances and their controls, as well as other visual aids. Training lectures were, for the most part, given "ad lib."

New Trend in Training

The introduction of instructors marked the beginning of a new trend in training. Prior to this time the student had only been brought in contact with a wide variety of information. No one had helped him assimilate the material or "culled" out the essential from the non-essential. At this point the instructors began to gather the material and organize prepared lectures, with material regarded as non-essential deleted. That early step of centralizing, organizing, and controlling information released as instruction formed the basis for most developments which have occurred since.

As time progressed, and more instructors were added, the need for a standardized method of presentation became evident as a precaution against offering widely varying work procedures based on each instructor's individual experience. The resulting standardization of material into well-defined lectures further centralized information and made it possible for management and supervision to exercise a greater degree of control over the program. Until this time, management and supervision's influence was exerted in training only in the formation of general objectives and policies. With instructions issuing from one source, it became possible for those groups to indicate within closer limits the information they wished released to employees.

These experiences and developments resulted in an integrated program which was used with considerable success during 1941, 1942 and 1943. Five hundred and fifty-three trainees received this type of training with reasonable success. Although originally scheduled to cover ninety days, training time was reduced to eighty days and finally to forty days, as experience was gained and refinements made.

Employees assigned to the training staff for instruction attended lectures one day each week and were sent into the field with experienced workmen where they performed those phases of the work they had discussed in previous meetings. Records were kept of each trainee's progress and he was advised periodically of his standing. At the completion of the training course, he went into the field accompanied by an operating supervisor and demonstrated his ability, or lack of ability, in the performance of the work. His training record and his performance in the field were compared against existing standards to determine his fitness for the job.

Under that type of training, instructors lectured to the students one day each week covering the fundamental principles of operation of the various appliances, and pointing out the service problems which occasionlly arise on any type of mechanical device. Information contained in the American Gas Association appliance manuals, Servel manuals and those made available by other gas appliance manufacturers were discussed in detail throughout these classroom sessions.

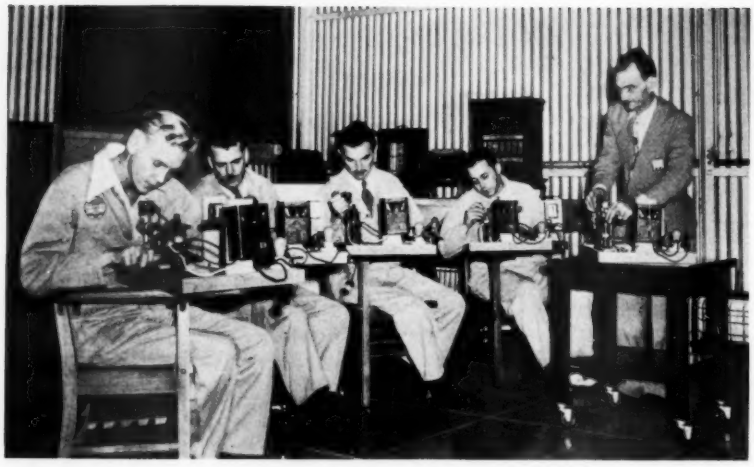
Cutaway Controls Used

Every representative thermostat commonly encountered in the area served by the company was cut away and mounted on individual standard-sized boards. Reference to these individual controls was consistently made to clarify previous discussions of schematic and "phantom" drawings covering the basic principles of operation. Various types of domestic gas burners were also cut away and mounted individually as supplemental aids in presenting burner design and combustion.

The next instruction step consisted of discussing and demonstrating complete operative assemblies of burners and thermostats for the range, refrigerator, water heater and furnaces. Finally, a cut-a-way water heater, furnace, range and refrigerator unit were introduced to assist the students in establishing the relationships of all integral parts.

By using the lecture and demonstration method, the various servicing procedures were presented and discussed, but the "know how" in applying that

Trainees in Southern California's laboratory-classroom learning the secret of "cold from heat."



"Mike" Johnstone demonstrates a point about furnace adjustment.

information was still being supplied, as the case arose, in the field by operating servicemen. As a result, students did not always have an opportunity to work on all four major classes of appliances during those seasons of the year when few service problems developed for any one particular class. Consequently, there were students who completed their course of training with limited field experience in servicing heating equipment, for example, while others had too little occasion to service refrigerators. The "know how" phase of such field training also varied according to the particular methods employed by the individual serviceman. Thus, as more critical standards of field performance were established, and the field techniques employed by servicemen were more carefully studied, the range of effectiveness between servicemen became more apparent and a need for a standardized training program became more evident.

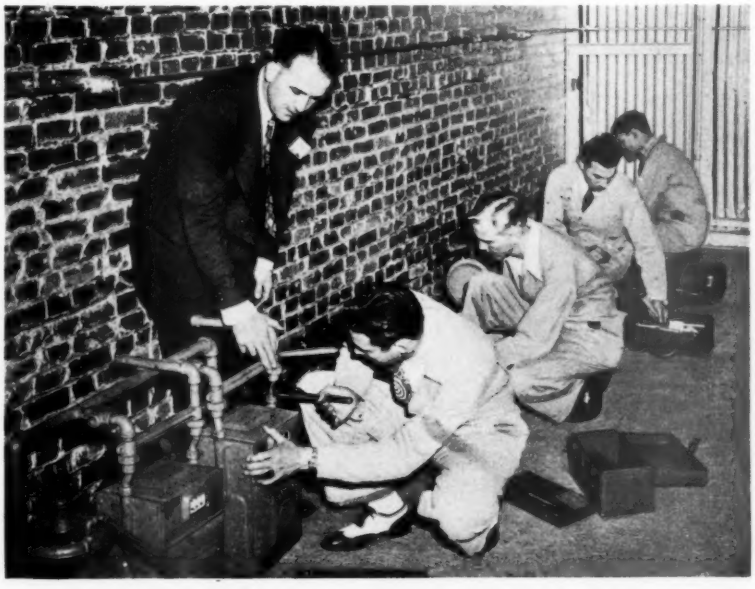
As a result of an appraisal of the entire service training picture during the latter part of 1943, it was concluded that little more progress could be made because of limitations inherent in the current program. Recent developments and anticipated postwar conditions gave rise to the following objectives which it was felt should be incorporated into present and future training activities:

1. Further reduction of the training period to approximately 24 days to meet the active postwar period when men now on military leave return for duty and when new employees are added to bring the present minimum force back to its normal complement.
2. Further assurance of complete understanding of principles and the development of fundamental skills through incorporation of the technique widely publicized by the "Training Within Industry" program.
3. Greater uniformity of operating practices among the operating group by limiting the student's contact with company operating personnel in order to guide his interpretations of company policy.

It was found that the previous program could not be readily adapted to include these objectives. In each case lack of control over the student's field training, which constituted 80% of the training period, seemed to represent the chief weakness of the program. It was accordingly decided that field training by servicemen should be discontinued.

The radical change of attempting to train students in the classroom to execute field assignments presented several problems. It was obvious, for example, that field conditions could not be completely simulated within a classroom. It was also equally apparent that students must necessarily have practice on servicing the various appliances that are encountered in the field. The classrooms shown in the accompanying photographs were therefore constructed with the view of meeting that requirement.

In each case, representative appliances were installed and used to offer the student an opportunity to overcome the typical problems encountered in the field. The appliances and demonstration models were connected to a supply of gas and are completely operative. The meter set assemblies, on the other hand, are connected to a supply



Gas meter work is taught in a specially equipped classroom.

of compressed air, which does not appear to reduce their effectiveness for training purposes.

The fact that all problems cannot be simulated on the training equipment makes it necessary for the student to have a rather sound background of principles which he can apply in meeting the unusual situations which are occasionally encountered. That need has been met by compiling a rather extensive course which includes such general topics as combustion, venting, and fundamentals of automatic controls.

After learning the basic operations of appliance servicing and meter work, the next step is to combine them into various patterns to complete a given type of assignment. Company Standard Practices and Appliance Manuals are regarded as valuable aids to the student in this step; the Standard Practices outlining in detail the service policy of the company, while the Appliance Manuals contain information relative to specific appliances. These manuals are viewed as a guide, telling the student where to apply the operations that he has learned.

On the basis of necessarily limited experience to date, it is felt that these field operations cannot only be taught within the training facilities, but in some respects it can be done more effectively than in the field. This is understandable because the student is not subjected to the distractions encountered in the field which retard the learning process. Also, it is possible to organize the material so that the student can direct his attention toward only one operation until it is completely mastered. Such organization is impossible under field conditions where the student performs the operations as they are encountered. This arrangement also makes it possible to be reasonably certain that the student encounters representative types of field problems.

Two neophytes learn welding from instructor W. C. Winchester.

The final step is to help the student through the transition period when he begins to apply his training in the field. He is sent into a district with an instructor who helps him "get his feet on the ground" and gives him final instructions. If, in the opinion of the instructor, the student is competent to perform the duties of his classification, he is released to the operating group. His work assignments, reduced in quantity at first, are gradually increased to normal as he becomes more proficient.

Program Potentials

This recently adopted plan is still definitely in the formative stage. It has been applied effectively to upgrade employees and to retrain a few men who have returned from military service. Experience in using it to train completely inexperienced people has been limited so that it is not possible at this time to make any conclusive statements regarding the total value of the plan. From the experience gained to date, however, it appears that these new objectives are within easy reach:

Reduction of the Training Period

1. Elimination of needless repetition of simple or unimportant operations.
2. Faster rate of learning due to breaking down the jobs into their component parts.
3. Elimination of distracting factors to promote quicker learning.

H. F. Jacobsmeyer gives instruction in water heater maintenance.

A cut-away gas range aids R. E. McKee in driving home a point.

The employee training office keeps training records, compiles material, etc. Above, R. C. Terradell, supervisor, and C. C. Westmoreland, administrative aide, discuss a problem.

Promote Greater Uniformity of Operating Practices

1. Classroom presentations can be uniformly presented.
2. Only safe, approved methods will be demonstrated to the student.
3. The Standard Practices and Appliance Manuals will guide the new employee, rather than possible erroneous interpretations of older employees.

Seasonal Training

In addition to the foregoing basic training which is administered to all new customer service employees, appliance "brush-up" review classes are conducted for the operating servicemen on a seasonal basis. For example, refrigeration review classes are held in the spring, while heating classes are scheduled for the early fall. Such training, of one day's duration, gives the servicemen an opportunity to refresh their memory on company service policies; add to their existing knowledge; and discuss service problems which may be of special individual concern.

The first such seasonal class followed the lecture, demonstration and discussion pattern used for new people. The importance of knowing the basic operating principles involved for each class of appliance was emphasized because it was felt that this represented foundation material important to effective servicing procedures.

Subsequent seasonal classes, such as those conducted in 1943, emphasized the mechanical difficulties that occasionally arise in connection with appliance servicing. During that meeting series, operative, representative types were installed and the students were given an opportunity to dis-assemble and manipulate them at length. The technique used that year required the servicemen to analyze difficulties which had been created by the instructor prior to the meeting. After identifying and correcting the original difficulties, the servicemen again threw the appliances out of adjustment, introduced other difficulties of their own making, and then traded appliances. In this way, practically every conceivable condition was encountered by the men during the eight-hour class.

Analysis Featured

The 1944 seasonal meetings featured analysis. This approach was chosen because a survey disclosed that servicemen were unduly concerned with what appeared to be a mechanical difficulty in cases where analysis and instruction to the customer would have corrected the problem. This was particularly true where the refrigerator was concerned. It was also seen that servicemen were prone to attempt adjustments on customers' equipment, which, because of its basic design, did not permit satisfactory or adequate performance. Such was the case when appliances designed for manufactured or liquefied petroleum gases were encountered on the company's natural gas system. It was equally true when off-brand, no-name heating equipment was encountered.

(Continued on page 51)

Why Not?

●Why should the ingenious, and often beautiful art of camouflage be confined to the uses of war? A gas-works need be no less efficient because it has the appearance of a beautiful forest.

London Daily Mirror.

Tool For Water Heater Sizing

Recently completed A. G. A. research provides new information on design and sizing of automatic gas water heaters to insure maximum efficiency

BY H. J. HENSE

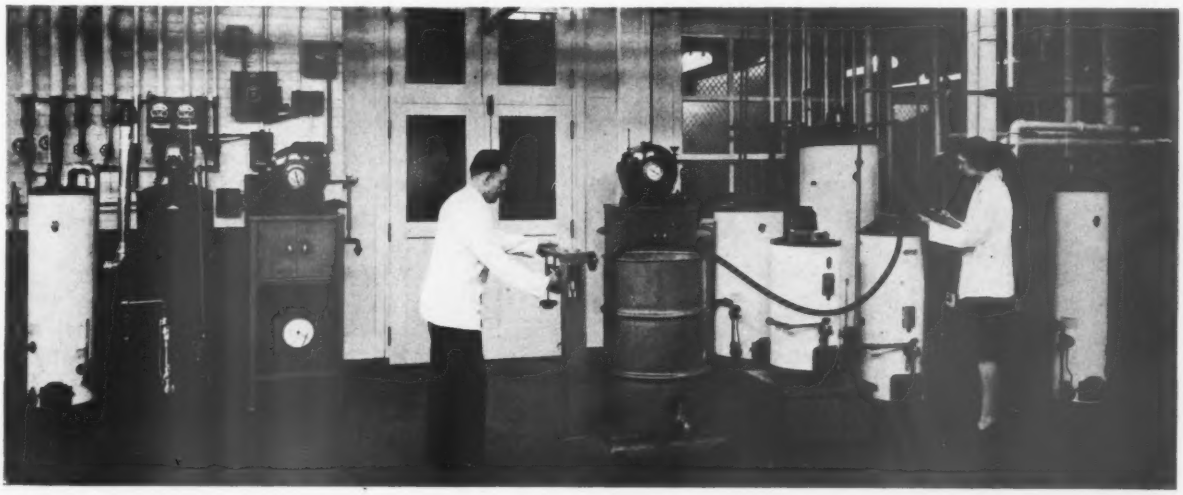
American Gas Association Testing Laboratories

PROVISION of modern gas equipment for maximum hot water service efficiency, like the solution of most practical problems, requires proper balancing of consumer needs on one hand and technical design factors on the other. Skillful selection of the proper combination of storage vessel size with the rate of heat application goes far towards establishing overall, long-range savings in maintaining a constant, continuous supply of hot water. Recently completed research clearly indicates that with modern automatic storage type gas water heaters this combination is the critical differential determining the service efficiency of specific installations.

Previous theoretical considerations set forth in "Fundamentals of Domestic Gas Water Heating," published in 1940 as Research Bulletin No. 9 by the American Gas Association Testing Laboratories, showed that service efficiency differences between automatic storage heaters employing and not employing an optimum size-rate combination may well be as high as 20 to 25 per cent. Members of the gas industry and the plumbing trade engaged in sales and installation activities will accordingly be interested in the new study. Its results not only largely confirm by actual test previous theoretical considerations, but also include valuable data and charts of a practical nature for guidance in specific instances where service efficiency is an important factor and hot water requirements can be determined within a reasonable degree.

The new bulletin "Principles of Design and Sizing of Automatic Gas Water Heaters for Maximum Service Efficiency" gives recommended gas input rates in combination with storage sizes for specific hot water requirements ranging from 20 to 100 gallons per day. These are separately tabulated in two series; one for quick recovery service, typical of demands of consumers desiring unlimited hot water with cost subordinated to fast service, and the other for slow recovery service where the cost of operation is considered of more importance than unlimited hot water supply. While the investigation was devoted principally to furtherance of service efficiency through proper sizing from a design standpoint, it included tests of effectiveness of the use of flue gas and hot water heat traps, elimination of metal to metal contacts at the base of heaters, comparative service performance of instantaneous and storage type heaters, and the possibilities of both two-stage heating and power burners.

Generally speaking, this study did not confirm widely held views that heaters of small storage capacity and high input rates are the most economical for quick recovery service while heaters for low recovery service should be of large capacity and low input rate. Service efficiency was found



General view of service efficiency test assembly. Flue gas trap is shown at extreme left and hot water heat trap on first heater right of center at rear.

to be approximately the same for different sized heaters having equivalent insulation when adjusted to operate at optimum input rates or the minimum rate at which each heater would produce a given quantity of hot water, maintaining at all times satisfactory combustion.

Thus for any of the daily draw requirements of the two tabulated classes of service, several size-rate combinations were found capable of providing economical service. A glance at Table I reveals considerable latitude of choice in considering any specific installation. The choice of effective size-rate combinations for a given daily draw in gallons provides a wide range in storage vessel size as will be readily evident from the figures given. Minimum input rates vary over an even wider range. Recommendations shown are for fast recovery service based upon the draw schedule for such service given in Table II.

Input Rates Lower

On the whole the input rates shown were found to be lower than those commonly used in practice. An interesting note in this connection is that the experimental rates found satisfactory in quick recovery service tests were even lower than those obtained on a theoretical basis as set forth in Research Bulletin No. 9. This trend became more pronounced with larger storage capacities. The difference can be accounted for as a result of stratification of hot water at the top of the storage vessel as calculated results were based on the assumption that cold inlet water thoroughly mixed with stored water between successive draws.

Sampling products of combustion from water heater equipped with low- and high-input burners for two-stage heating.

Eight automatic storage type heaters and one instantaneous type were employed in the investigation. Storage heaters were of both internal and external flue types with tank capacities of from 10 to 75 gallons. Normal input rates ranged from 10,000 to 45,000 B.t.u. per hour. Five different basic draw schedules were employed with no single draw in any instance permitted to exceed 80 per cent of the storage vessel capacity. Inlet water at room temperature of 70° F. was employed. With a thermostat setting at 150° F., a resultant temperature rise of approximately 80° F. was thus obtained. Minimum input rate for any given daily demand was considered as that capable of delivering water at a minimum temperature of 130° F.

For fast recovery service a draw schedule was used typical of such service, 60 per cent of the daily supply of hot water being withdrawn within a period of one hour in three individual draws of equal amount as shown in the table. Each was made at a rate of approximately four and one half gallons per minute.

For low recovery service the draw schedule used was that selected several years ago by the National Electric Light Association from results of a customer survey. It is considerably less severe than the fast recovery schedule in that it provides for a greater number of draws over a longer period of time. The greatest single draw is 17.3 per cent of the total daily draw, followed at one hour intervals by two

TABLE I—RECOMMENDED HEATER SIZES FOR SPECIFIC HOT WATER REQUIREMENTS AND MAXIMUM SERVICE EFFICIENCY (QUICK RECOVERY SERVICE)*

Hot Water Draw U. S. Gallons Per Day	*Gas Input Rate—B.t.u. per Hr. Storage Vessel Size—U. S. Gallons*						
	10	*15*	*20*	*30*	*40*	*50*	*75*
20	9,000	7,000	4,500				
30	13,000	10,500	8,500				
40	16,000	14,000	12,000	7,500			
50		17,500	15,500	11,000	6,500		
60			19,000	14,500	10,000		
70			22,500	18,000	13,500	9,000	
80			26,500	22,000	17,500	13,000	
90				25,500	21,000	16,500	
100				29,000	24,500	20,000	8,500

* Based on 150° F. thermostat setting and 70° F. inlet water temperature. For inlet water temperatures above or below this value subtract or add respectively 375 B.t.u. per degree F. temperature change per 100 gallon daily draw. Data applies to new heaters.

TABLE II—SCHEDULE OF DRAWS EMPLOYED FOR SERVICE INDICATED

B Fast Recovery Service		C Low Recovery Service	
Time Hr.	% of Daily Draw	Time Hr.	% of Daily Draw
0	20	0	10.7
½	20	1	5.3
1	20	1½	17.3
3	10	2½	13.4
5	10	3½	13.4
10	5	4½	4.0
15	5	5½	4.0
23-24	10	6½	6.6
		10½	2.6
		11½	4.0
		12½	5.3
		16	13.4

draws of 13.4 per cent. Minimum input rates required for the moderate schedule naturally are considerably less than those determined for fast recovery service. Draw schedules discussed above are shown in Table II.

Temperature of inlet water not only affects the cost of producing hot water but is important in determining the proper size-rate combinations for delivering an adequate supply at periods of peak demand. Tests disclosed a consistency of results for three different size heaters which permitted derivation of a method for calculating corrections. Applied to the recommended size-rate schedule for fast re-recovery service it was found that 375 B.t.u. per degree temperature change per 100 gallons daily draw should be subtracted or added for inlet water temperatures above or below 70° F. respectively. For low recovery service the corresponding correction factor is 220 B.t.u.

The importance of proper selection of size-rate combinations where maximum efficiency is desired is closely associated with the relationship of hot water demands to gas consumption. This is readily evident from the fact that as the quantity of hot water drawn decreases, the cost per gallon rises rapidly. Under conditions of actual usage, as the quantity of water drawn approaches that which the heater is capable of delivering under continuous operation at full input rating, service efficiency approaches the thermal efficiency of the heater. Conversely, if no water is drawn for some time, for all practical purposes service efficiency approaches zero since no useful heating is performed during that period. Between these two extremes it becomes apparent that service efficiency rises as the amount of water drawn is increased. Hence oversizing either or both of the size-rate factors results in low operating efficiencies while undersizing obviously results in inadequate and unsatisfactory hot water service.

From the standpoint of design, such variations in service efficiency as were found for various heaters when operated at minimum input rates proved to be due largely to differences in insulation. They practically disappeared when due consideration was given to such differences. Experimental elimination of direct metal to metal contacts between storage tank shell and heater base and the insulation of the base from the combustion chamber failed to improve performance beyond that normally obtained in contemporary heaters originally designed to minimize heat losses through the base.

Instantaneous heaters of the coil type included in this investigation were found to have a service efficiency comparable to that of representative storage models. However, their efficiency was appreciably reduced by increases in pilot input rates and slightly lowered by increased frequency of draws. Apparently heat provided by the pilot is not effectively utilized except during period when water is being withdrawn. For a 50 gallon daily hot water requirement under the draw schedule used for quick recovery service there was an actual 8 per cent difference in efficiency for an average difference in pilot ratings employed of 550 B.t.u. per hour. This difference became less pronounced as the daily delivery was increased. Frequency of draw influences efficiency since heat is lost by the cooling of coils during off periods.

Heat Trap Tests

Tests conducted with flue gas and hot water heat traps did not result in significant gains above those obtained without their use. A series of standby loss tests with a heater equipped with a "U" shaped flue gas trap 24 inches deep and 3 inches in diameter were made. In the case of hot water heat traps the extensive investigation formerly reported in Bulletin No. 9 was supplemented. In the former study tests were confined to traps with horizontal runs of piping. Special cases where piping extended vertically above the heater to the second floor were included in the current study but did not alter former conclusions.

In determining the possibilities of increasing service efficiency by somewhat more drastic design adaptations, a two-stage heating arrangement was incorporated in one heater and a power burner installed in another. A two-stage heating system making use of a 3,000 B.t.u. per hour auxiliary burner with separate flueway and thermostat was employed to determine if any advantage would result from a combination of both low and high input

(Continued on page 52)

To Build Novel Prefabs

● Airplane companies, greatly expanded by war production, have been casting around for ways to use extra capacity when the war is over. According to *Business Week*, as one means to solve the problem, Beech Aircraft Corp. announced recently that it will undertake mass production of the most novel of all prefabricated houses, Dymaxion dwelling machines.

Because Dymaxion houses will be made of aluminum, steel, rubber and plastics, Beech officials stated they have "great hopes" the prefabs can be turned out with aircraft materials, skills and plant facilities. A prototype of the proposed version of the Dymaxion house is now under construction at Beech's Wichita (Kan.) plant.

Dymaxion dwelling machines were invented in 1928 by R. Buckminister Fuller, but they have never been produced commercially. Hexagonal in shape, the dwelling machines resemble a merry-go-round, being suspended above the ground on a steel mast or core. Within the mast is contained all the machinery for a modern house—elevator, heating, lighting, air conditioning, dishwasher, and laundry.

The word Dymaxion was especially coined for Fuller by a friend to fit the ideas developed by his "four-syllable personality." It is a copyrighted term.

What About Kitchens?

Gas industry's program to provide tomorrow's home-maker with the ultimate in more attractive coordinated kitchen units

BY E. CARL SORBY

Vice-President, Geo. D. Roper Corp., Rockford, Ill. and member, A. G. A. Domestic Gas Range Committee

E. Carl Sorby

JUST by way of background, let's look at the word "kitchen." It comes from the Anglo-Saxon "cycene" and the Latin "coquina" or "coquere" means "to cook." Kitchen is defined by Webster as "a room or part of an establishment appropriated to cookery."

The kitchen, as most people know it today, "just grew"—without any particular rhyme or reason. Kitchen coordination is the effort to lend scientific planning to that much-used but neglected room.

Architects, builders, utility companies, furniture stores, department stores and others have in the past talked about "coordinated" kitchens, whether or not that exact expression has been used.

New Horizons in Kitchens

Although the basic ideas of kitchen coordination are not new, present concepts of the coordinated kitchen of the future are entirely new and refreshing. They open up virtually unlimited horizons for increased acceptance of modern kitchens and, in turn, for increased dollar volume for the store having gas appliances to merchandise.

The classic approach to kitchen design has been and still is the establishment of three main centers of activity. First comes the range center at which the food is cooked. Second, the refrigeration center at which the food is preserved. Third, the sink center at which dishes are washed, vegetables prepared for cooking and other operations performed. There has recently been much discussion about a fourth center—for food mixing. Surrounding these basic centers of activity are cabinets, shelves, drawers and working surface. It is the skillful combining of all these ingredients in pleasing harmony that makes a coordinated kitchen. Each element must be placed in respect to the ease of accomplishment of its specific task. Furthermore, each element must be positioned in relation to the others so that a smooth functional operation of the entire kitchen is the result.

Appearance is important. But appearance alone at the sacrifice of workability is not desirable. In the modern coordinated kitchen, as envisioned by the American Gas Association Coordinated Kitchen Committee, beauty of appearance and beauty of function go hand in hand.

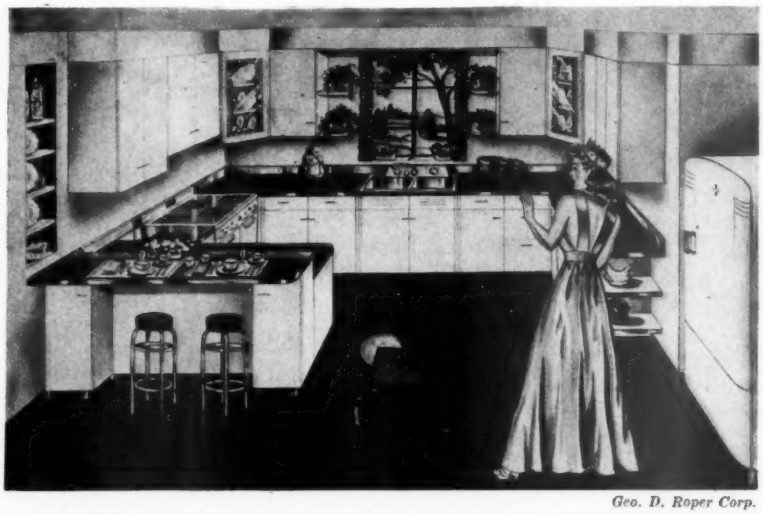
Other developments, in addition to those named above, may also be associated with kitchen planning. Some ideas envision placing an undercounter water heater in the kitchen instead of in the basement. Some plans, already drawn up, provide for moving the laundry from the basement to the kitchen or a room adjacent to the kitchen.

Many leading architects and designers believe that the kitchen is too nice a room, too attractive a setting to be shut off by itself. The kitchen may become a part of the dining room or even the living room or combined with the latter to become one large room. Although this thought may seem somewhat fanciful at first, certainly there is nothing in the kitchen of tomorrow that should be hidden from the eyes of guests.

Ventilation Important

You have heard about coordination and you have also heard about ventilation. Before going further, let's clear up the question "What Is Kitchen Ventilation?"

Proper ventilation in a kitchen is the scientific removal of food cooking vapors. Let us set one thing straight for the record right now—vapors associated with cooking are not the result of any particular cooking method or the use of any particular cooking fuel. Vapors are the result of releasing into the air certain elements during the cooking process. Ventilation of the kitchen anticipates the removal of vapors from all centers of activity in the kitchen. It is a postwar objective.



Geo. D. Roper Corp.

A delightful all-gas kitchen arrangement which leaves little to be desired. It combines beauty and utility in a setting which can be reproduced immediately after V-day. The service bar is just one of many popular new innovations which make it unique as well as practical.

The kitchen of tomorrow can be both a coordinated kitchen and a ventilated kitchen. But a kitchen can be coordinated without being ventilated or can be ventilated without being coordinated.

In order to put first things first, our primary objective should be to establish a coordinated workable unit. Superimposed upon this as the next step and as a further desirable objective is complete ventilation of the kitchen so that the housewife spends her time in ideal surroundings, free from disturbing vapors. Before that can come into being, however, engineering must be completed.

Gas Cooking Excels

Facts prove that most of the operations to be performed in the kitchen can be done better with gas. Facts prove that cooking with gas, refrigerating with gas, air conditioning with gas, heating water with gas, and heating homes with gas is the superior way of performing these various services.

Certainly the gas kitchen of tomorrow will be a glamorous kitchen. Certainly the gas kitchen of tomorrow will be an efficient kitchen in which to perform all of the tasks normally associated with the preparation of meals.

The A. G. A. Coordinated Kitchen Committee, working in conjunction with the Postwar Planning Committees of the American Gas Association and the Association of Gas Appliance and Equipment Manufacturers, is establishing standards which will bring about the desired result.

The gas industry is doing more than talking. The new gas kitchens are already designed and named.

The name, selected by utility employees in a nation-wide contest, is "New Freedom Gas Kitchens." It's a catchy salable name that really describes what these new kitchens will do for Mrs. America.

In the past, each of the various gas appliance manufacturers has, to a considerable degree, gone merrily along his way, making his particular appliance to fit his own predetermined ideas, dimension wise. By the same token, the manufacturers of kitchen cabinets have not gotten together until recently in their specifications of height and depth of base indentation, depth of working surfaces, depth of cabinets, etc.

By establishing, as quickly as possible, standard dimensions to which all leading manufacturers would subscribe, the gas industry will provide an important service for the dealer, department store, the furniture store, the gas utility company and the ultimate consumer.

Further objectives of the gas industry will be to intensify in the mind of the consumer the realization that she can get the finest in kitchen equipment when she selects gas burning appliances—finest in design and finest in operating features.

Gas companies and other gas appliance merchandisers in all parts of the nation are establishing kitchen planning centers. Housewives will be invited to come to these centers for the latest ideas in kitchen designs and kitchen appliance suggestions. In cooperation with the various kitchen cabinet manufacturers, plans are being developed for submitting to the housewife colored renditions showing specifically how the various gas appliances and cabinets will be tailored to fit her particular kitchen.

The architect and builder will have an important place in the coordinated kitchen picture. They will be kept abreast of all developments and will be asked to contribute to the successful operation of the various kitchen planning centers. By the same token they will be placed in a position to re-

Reproductions of display cards tying in with the new theme of the A. G. A. national advertising program, available through Bishop Publishing Co., 427 W. Randolph St., Chicago 6, Ill. The large Victory size (59" x 42") features a full-color enlargement of the first ad in the new series. Two other kitchen designs appear in the displays at top which are 29½" x 42".

H. Vinton Potter, director of the Coordinated Gas Kitchen Program, shows a Vanguard movie starlet, Rhonda Fleming, a model gas kitchen in Chicago. Miss Fleming is playing the second feminine part to Ingrid Bergman in David O. Selznick's "Spellbound" to be released in February.

A heartwarming Christmas scene combined with the gas flame to make this striking advertisement of the Pacific Coast Gas Association.

ceive specific advantages from the maintenance of these centers.

Nation-wide promotion, as evidenced by the American Gas Association in its current advertising and by gas companies and dealers in local promotion, will carry the message to the homemaker wherever she may be.

The A. G. A. national advertising program will further emphasize the kitchen as the center around which all the functions of gas can revolve. This will be augmented by advertising now being done and planned for the future by gas appliance manufacturers.

CP Range Focal Point

Gas ranges bearing the famous CP seal will occupy an important position in the thinking of the industry. This range wraps up in one unit everything that the housewife could possibly desire in the way of a cooking appliance. Gas ranges built to CP specifications assure the owner of a predetermined high standard of performance, removing all guesswork and uncertainty in the purchase of a new range.

The prospective purchaser can quickly read the CP specifications and instantly know exactly what that range will do when it moves into her kitchen. And the new gas ranges built to CP standards are, of course, being designed in step with overall kitchen coördination.

These new gas ranges bearing the famous CP seal will act as the nerve center, the very heart of activities in those marvelous new gas kitchens you will be selling come the peace. No wonder you hear so much about coördinated kitchens. They're something hot to prepare now and to merchandise in the immediate postwar future.

ECONOMICS OF SALES REPORT ANALYZED BY NEW ENGLAND GAS MANAGERS

Hall M. Henry

THE second of a series of Company Managers' Conferences sponsored by the New England Gas Association to analyze the fundamental problems of the New England gas industry was held December 1 at the Parker House, Boston, Mass. It was attended by 53 gas company managers representing companies serving the bulk of the gas customers in that area. Following procedure laid down at the first conference, the Association's president, Hall M. Henry, presided at the morning session while R. J. Rutherford, chairman of the Company Managers' Conference Committee, presided at the afternoon session.

Purpose of the meeting was to develop further data for the New England companies on the subjects covered in the Economics of Sales report of the A. G. A. Postwar Planning Committee. Able presentations were made by seven selected representatives of the New England group, followed by prepared discussions and comment from the floor. Definite conclusions and recommendations were reached on seven factors dealing with the Economics of Sales as follows:

1. A detailed analysis should be made of market potentialities by each company.
2. The operating report is an unsatisfactory means for evaluating New Business results and a suggested method might well be adopted by the different companies.
3. There is a base minimum New Business expense which a company will have regardless of whether or not it wishes to increase revenues.
4. The revenue life (not physical life) of refrigerators, water heaters and house heaters is at least 10 years. (In other words, a company can safely count on obtaining a minimum of 10 years of revenue from each such appliance which it sells.)
5. The efforts of Home Service personnel, in addition to being effective and valuable in building good public relations and showing customers how to get the most out of their appliances, can be measured by the increased revenues produced through their calls.
6. Sales results are in direct proportion to the number of salesmen employed.
7. Companies that spent above average on New Business showed better net operating revenue gains as well as gains in M.c.f. and gross revenues than companies that spent below average.

The presentations were made by: E. G. Twohey, dist. mgr., Central District, N.E.P.A., Worcester; J. A. Hiller, sales manager, Portland Gas Light Co.; Roy E. Wright, director of gas sales, Negea Service Corp.; C. W. Moody, sales manager, Cambridge Gas Light Co.; R. D. Stuart, Jr., general merchandise manager, Blackstone Valley Gas & Electric Co.; J. C. Willis, representing Brockton, Fitchburg and Springfield companies; and J. J. McKearin, manager of domestic sales, Boston Consolidated Gas Co.

Prepared discussions were contributed by: R. E. Ramsay, president, New Haven Gas Light Co.; D. H. Levan, pres. and gen. mgr., Lowell Gas Light Co.; E. H. Eacker, vice-president, Boston Consolidated Gas Co.; G. G. Howie, vice-president and gen. mgr., Cambridge Gas Light Co.; P. J. Rempe, vice-president, Stone & Webster Service Corp.; H. B. Hall, mgr., Old Colony Gas Co.; John West, president, Worcester County Electric Co.

President Henry announced the appointment of Gordon G. Howie, vice-president and general manager, Cambridge Gas Light Co. as chairman of the Cost Accounting Code Committee. Purpose of this committee is to develop a uniform code which could be adopted by the New England companies in making an analysis of investment and operating costs to perform certain important specified gas manufacturing functions.

Tea Topic

● American postwar planners have stirred up considerable interest outside this country. For example, Danton Walker, New York Daily News columnist, reveals that the chief topic of conversation among the great ladies of England is how to get a postwar American kitchen. They must have heard of the coordinated all-gas kitchen or have spotted one of those eye-filling kitchens in the new A. G. A. national advertisements.

Incidentally, any American range manufacturer wanting to cash in on this interest should provide plate-warming facilities in his product as the English consider them a necessity. This tip comes from an American lady who lived more than 20 years in England.

Progress In Household Refrigeration*

Refinements in heat-operated absorption refrigeration units since 1928 bring excellent mechanical improvements but little fundamental changes

BY R. S. TAYLOR

Servel, Inc., Evansville, Ind.

R. S. Taylor

THE period from 1920 to 1930 was a very active one in the development of the household refrigerator. It was during this period that the compression unit changed from being a miniature edition of large tonnage units to a unit designed for the purpose intended. The remotely installed unit for all practical purposes lost out and the hermetically sealed unit appeared both in the compression field and in the absorption. Many new ideas and devices appeared during this period which have since dropped by the wayside. In much the same way designs of the absorption systems changed from reduced copies of the large unit to specially designed systems.

Heat-Operated Cycles

Along with the advent of the Ice-O-Lator and the Servel (Platen Munters System), numerous other heat operated cycles were conceived. I reviewed a number of these in a paper before the A.S.R.E. in 1928[1], at the same time discussing somewhat the question of refrigerants and absorbents. In June, 1944, Dr. Hainsworth, in a paper on refrigerants and absorbents,[2] brought up to date this part of the subject. It should also be of interest to bring up to date that part of my early paper dealing with the different types of absorption systems.

As a convenient means of classification, I shall use the same system as used in the previous paper, which was based on the number of active fluids participating in the cycle. The simplest type according to this method of classification is the single-fluid or standard compression unit with only the refrigerant entering the cycle. The next is the ammonia-water or similar absorption unit and related units of the two-fluid variety wherein two materials are active in the cycle. Then we have the three-fluid units wherein an inert gas is used such as the Servel unit, and so on depending on our ingenuity in conceiving new systems.

Single-Fluid Units

Since 1928, although excellent mechanical improvements have been made very little change from a fundamental principle standpoint has taken place in the single-fluid or compression unit. The development of excellent new refrigerants by the chemist in the organic halogen compounds and more specifically those containing fluorine has been a major contribution to the single-fluid unit development. The many mechanical refinements made throughout this period are also major items in this development.

For example, improvements in valve structures have enabled increase in speeds up to the motor speed. Improvements in motor windings have permitted hermetic units with the motor windings in contact with the refrigerant. Improved cleanliness and new treatments for motor windings have enabled usage of the capillary restrictor in place of expansion valves and high or low side float controls. For larger units, multicylinder compressors have replaced the large low-speed compressors. Multistage compressors have had many war applications for very low temperature uses.

Two-Fluid Units

Of the two-fluid units, the ammonia absorption unit as used commercially continues to be successful in its specific fields and except for mechanical refinements remains much the same. For purposes of reference and comparison this is shown in Fig. 1 in an overly simplified diagram.

Ammonia is driven off from the generator (A), condensing in the condenser (B). (C) is the expansion valve for lowering pressure. The ammonia evaporates in the evaporator (E) and is absorbed in the absorber (F). The absorber gets its absorption fluid from the generator through the pressure reducing control (G) and the absorption fluid after taking up refrigerant is returned to the higher pressure in the generator by the mechanical pump (H).

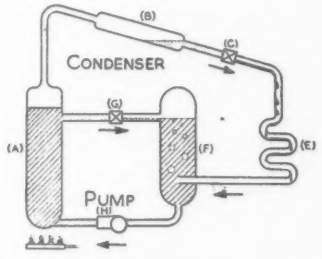


Fig. 1. Absorption unit; ammonia-water.

Of the two-fluid units using a mechanical pump for transferring absorption fluid from low pressure to high, it is believed the Williams Air-O-Matic unit should be mentioned as a late modification which has had acceptance in some applications. This is

* Presented at the 40th Annual Meeting of The American Society of Refrigerating Engineers, New York, N. Y., December 11, 1944.

[1] *Refrig. Eng.*, Vol. 17, No. 5, p. 136, May, 1929.

[2] *Refrig. Eng.*, Vol. 48, No. 3 and No. 4, Aug. and Sept., 1944.

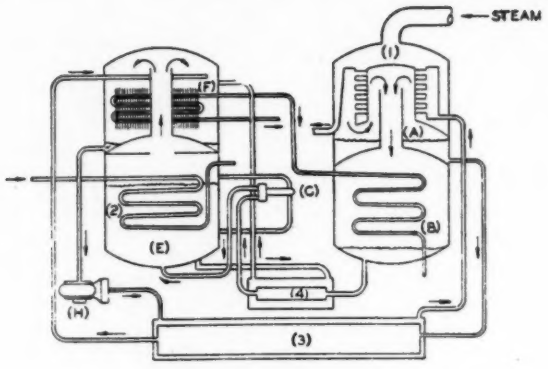


Fig. 2. Williams Air-O-Matic unit.

shown in Fig. 2 in diagrammatic form, the same letters being used to indicate corresponding parts shown in the simplified diagram, Fig. 1. (A) is the generator heated by the steam in (1). Refrigerant vapor passes as shown into the condenser (B) which is water cooled and from there through the expansion member (C) into the evaporator (E). Here it evaporates absorbing heat from the chilled water coil (2). The refrigerant (methylene chloride) is absorbed in the water cooled absorber (F) by the absorbent (Dimethoxytetraethylene gycol). Absorption solution rich in refrigerant is pumped back to the higher pressure by the pump (H). After refrigerant is removed in the generator, the absorbent is sprayed back into the absorber through spray nozzles. (3) is the heat exchanger between the rich and weak solution. (4) is the solvent return exchanger to return absorbent collecting in the evaporator back to the absorber.

All two-fluid units have a high and low pressure side if operated continuously. In order to transfer the absorbent rich in refrigerant from the low pressure in the absorber to the high pressure or generator side a mechanical pump is used in the units mentioned above.

Besides using external mechanical energy to circulate absorption solution in the continuous two-fluid unit, heat energy is available and may be used for this purpose. The heat, of course, gives us a pressure difference and this alone or together with gravity must give us the energy to transfer liquid from the low to the high pressure side. The control of the use of this heat can be effected in many ways and has been the subject of a number of inventions. For example, changes in temperature, changes in concentration, liquid level changes, changes in vapor pressure, etc., can be used for this purpose.

Let us look at some typical cases. Many of the devices employ a transfer means or vessel which intermittently fills with rich solution from the absorber and discharges this to the high pressure or generator system. In the Buchel unit (U. S. Patent No. 1,903,-437), the transfer vessel fills due to a drop in vapor pressure caused by a bleed in of weak absorption liquid plus gravity. When the chamber is filled, a portion overflows into a heated bulb and exerts pressure forcing the solution into the high pressure side through a check valve. When all cold solution is expelled, the heated vapors follow past a temperature expansion member, which operates a valve to equalize the pressure with the low pressure side and permits the vessel to fill again. Here we have transfer caused by intermittent application of heat on the bulb mentioned above controlled by the temperature of an expansion member.

In the Schurtz unit (U. S. Patent No. 1,905,308), absorption solution in filling the chamber or transfer vessel by gravity lifts a float mechanism. When the float mechanism reaches a predetermined point, it operates a valve device to close the vessel to the low pressure side of the system and open it to the high pressure side. The solution then flows by gravity to the boiler emptying the chamber and causing the float to drop. This closes the chamber off from the high pressure side and opens it to the low side starting the cycle over again. Here we have liquid levels controlling the circulation.

The Mills Novelty Company unit (U. S. Patent No. 2,150,369 and No. 2,329,192) uses a change in vapor pressure of the absorbent in the absorber to control the liquid transfer.

Then we have the case where changes in concentration or temperature due to concentration controls the circulation as in the Roth unit of the Gibson Refrigerator Company (U. S. Patent No. 2,339,811 and others). This is shown diagrammatically in Fig. 3 and will be described in some detail because it is a more recent version of a transfer type of unit. For comparative purposes those parts of the unit related to similar parts in the basic unit of Fig. 1 are marked with the same letter and all other parts are numbered. This practice will be followed in all illustrations.

Transfer Type of Unit

Heat is continuously supplied to the generator (A) and controlled thermostatically by a thermostat on the evaporator. Ammonia vapor from the generator passes through the rectifier (1) and condenser (B) to the evaporator where delivery to the evaporator (E) is by means of a float control (C). The refrigerant vapors from the evaporator enter the rising leg (2) inducing circulation in the absorber circuit (F) which is fed with fresh solution from the generator through the liquid heat exchanger (3), the feed being controlled by the float (G) maintaining the absorber liquid level. Rich solution from the absorber circuit is returned to the high pressure or generator side of the system by means of the tube (4) and transfer system (5) and (6).

Starting our description where container (5) is at low pressure, rich solution flows into the container (5) until the temperature of the control bulb in the generator increases due to distillation of ammonia to the point where the control (6) is operated. Then control (6) takes the position shown in the diagram and container (5) is connected to the generator through the pipe (7) and liquid heat

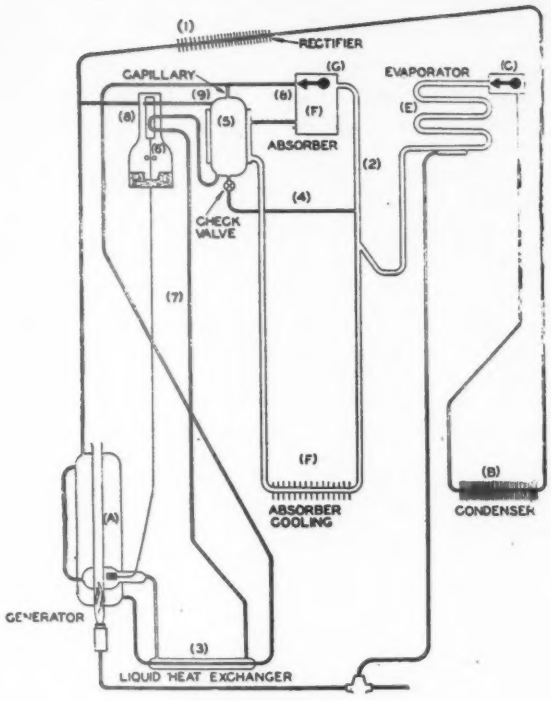


Fig. 3. Roth refrigerator unit.

exchanger (3) at the same time the ammonia vapor line (8) is opened to the top of vessel (5). Rich solution flows through (7) until the bulb in the generator is cooled to a predetermined point when control (6) cuts off vessel (5) from the high pressure side. The flow of weak liquid through the capillary (9) reduces the pressure in (5) to the point where absorption liquid again flows into the container (5) and the cycle repeats itself. Hence we have here a case where the change in concentration causes a change in temperature which actuates the transfer control.

The most direct way of utilizing the heat to effect transfer of absorbent solution from the low pressure to the high pressure side would be through the use of a continuous heat operated pump inside the system. A pump of this sort is a form of the vapor lift type pump. This is most efficient where the pressure differences are not too large. This means that when used on a two pressure unit the difference between high and low side pressures must not be very large. This in turn limits us to a low vapor pressure refrigerant. As an example, let us use water as the refrigerant. Since water will freeze at 32° F., let us use it for air conditioning at say 40° F. The vapor pressure is about 6.3 millimeters of mercury at this temperature. Assuming a condenser temperature of 100° F. we get a pressure on the high side of about 49.2 mm. mercury or a pressure difference of 42.9 mm. mercury or about 23 in. water column as the pressure difference which must be maintained by the heat operated pump or vapor lift with this refrigerant and under these conditions. This also means that we can use a liquid column between the condenser and evaporator instead of an expansion valve or float control and a liquid column instead of a weak liquid control for feeding absorption liquid to the absorber. Now we have a two-fluid, two-pressure unit without moving parts which is the Servel air conditioning unit shown in Fig. 4 (U. S. Patent No. 2,282,503 and others).

Here (AH) is the vapor lift pump and generator combined. Vapors from this pass up through (1) into the condenser (B). Condensed refrigerant goes to the evaporator (E) through the trap (C) which is sufficiently deep that it will always form a trap under all differences in pressure encountered in the operation of the unit. Thus the trap (C) replaces an expansion valve or float control.

The refrigerant evaporates in the evaporator (E) producing refrigera-

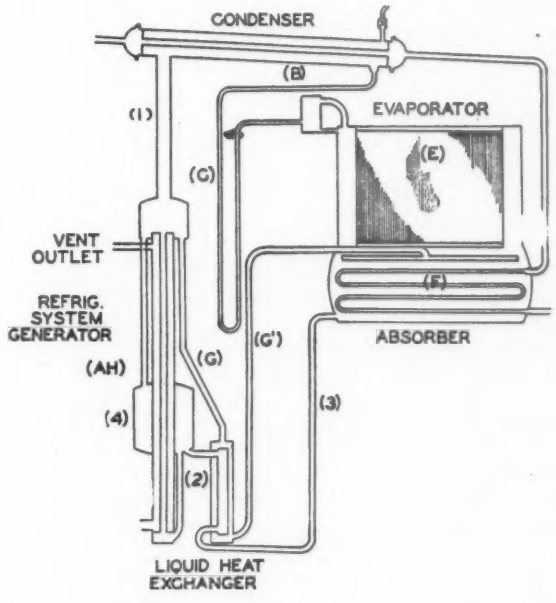


Fig. 4. Servel air conditioner unit.

tion and the vapors pass down the channels on the two ends of the evaporator into the absorber (F). Absorbent weak in refrigerant passes from the generator through the pipe (G), liquid heat exchanged (2) and pipe (G^1). Here again (G) and (G^1) form two legs of a trap the bottom of which also contains the liquid heat exchanger and the heights are such that a trap is always formed regardless of the pressure differences encountered between the absorber and generator in operation of the unit. Hence this trap replaces the weak liquid control valve in a standard absorption unit.

The absorption solution rich in refrigerant flows from the absorber through pipe (3) and liquid heat exchanger (2) into the pot or container (4). This serves as a feed for the vapor lift pump (AH) which raises the liquid to the higher pressure and level in the unit. Hence, the vapor lift replaces the mechanical pump or transfer device in other absorption units. The vapor lift and generator is heated by atmospheric steam entering at the bottom. The condenser and absorber are cooled with water as shown.

More than 400 of these units have been produced in pilot plant production by Servel for air conditioning uses and it is planned to market the unit actively after the war. An experimental model has been in continuous service in my home for air conditioning for five and a half seasons with satisfactory results.

If one is willing to accept intermittent refrigeration, the condenser and evaporator can be made one vessel and the generator and absorber one with a vapor connection between. Such a unit is the Crosley Icyball (U. S. Patent No. 1,857,440) which was introduced into production a number of years ago.

Solution is heated in one container and condensed in the second which is cooled by water. After a certain time the heat is removed and the first container cooled by water or air. Refrigeration is then produced in the second container. This type of unit has been built both with solid and liquid absorbents. Ammonia is the refrigerant in the majority of cases.

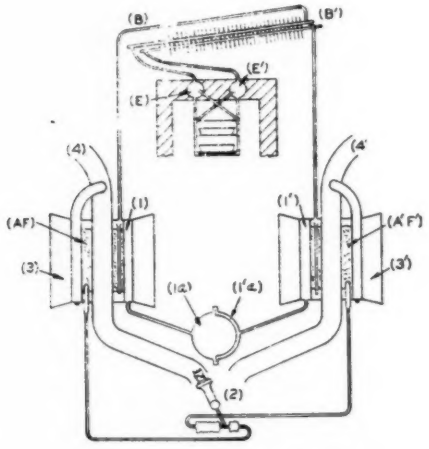


Fig. 5. Kleen intermittent absorption unit.

Numerous intermittent units have been designed and built. Some have been marketed, some not. The variations are mostly in the means employed to get holdover or to lessen the effect of the intermittent refrigeration produced, means for returning the absorption solution carried into the evaporator on units employing liquid absorbents, and in means for intermittent control.

Others of this type are the Keyes Ice-O-Lator (U. S. Patent No. 1,698,847 and others) which later became the Frigidaire Faraday, the Keith (U. S. Patent No. 1,816,975 and others) or Perfection Stove Company kerosene Superflex, The Gibson Kerosene Refrigerator (U. S. Patent No. 2,055,733 and others), the Allyne (U. S. Patent No. 2,177,796 and others) or Sears Roebuck Coldspot Kerosene refrigerator, The Munters (U. S. Patent No. 2,086,632 and others) or Servel Cyclic (never marketed), and others.

The latest of these to come to our attention is the Kleen unit which is the subject of numerous patents issued to Nils Erland of Kleen (U. S. Patent No. 2,257,735 and others). The patents cover numerous forms of and controls related to this unit. One form is shown diagrammatically in Fig. 5 and will be described here as representative of the intermittent units. This is in effect two solid absorbent intermittent units combined in one system to produce essentially continuous refrigeration. (AF) and (A'F') are the generator-absorbers of the two units. (B) and (B') are the condensers for the two units. The evaporator (E) and (E'), although it serves as a single evaporator, is in reality two evaporators. A secondary fluid system (1) and (1') assists in the intermittent cooling of the absorber-generators and heat is applied continuously by the burner (2) first to one unit and then to the other. The unit to be heated is chosen by the control bulbs in the generators, which, when one generator has been distilled free of refrigerant to a predetermined point, transfers the flame to the other generator flue.

Operation of Kleen Unit

In operation the unit functions as follows: Heat is applied to the generator (AF) as shown in the diagram. This drives the heat transfer fluid out of (1) in the bulb (1a). The bulb (a) is partitioned in the center with a flexible diaphragm so that the secondary fluid in the (1'a) side is at the same time pushed into the cooler absorber-generator (A'F') and here assists in the air cooling of (A'F'). The heat in (AF) drives off refrigerant into the condenser (B) and the (E) section of the evaporator. In the meantime, refrigerant is evaporating in the (E') section of the evaporator passing back through the (B') section of the condenser into the absorber (A'F') which is cooled by the fins (3') in heat exchange relationship with (A'F') through the secondary fluid in (1').

When distillation is complete in (AF), the heat source or burner is moved to flue (4') and heats generator (A'F'). The fluid in (1a) is transferred to (1) and out of (1') into (1'a) and the system (A'F'), (B'), and (E') becomes the high pressure side while the system (AF), (B) and (E) becomes the low pressure or refrigerating-absorbing side of the dual system.

There is one other two-fluid unit which is more closely related in some ways to the single-fluid unit. This is the Stator unit (U. S. Patent No. 1,-756,802 and others). In this unit a heat operated pump inside the unit is used to compress the refrigerant of a single fluid unit from the low or evaporator pressure to the high or condenser pressure. This heat operated pump is a mercury vapor jet pump and the unit is classed as a two-fluid unit because of the mercury used for the pumping.

Another related heat operated unit used for air conditioning and in process work is the steam ejector system using a steam ejector in place of the mercury vapor jet. Its special peculiarity is the fact that the working fluid is wasted instead of being recycled. The cheapness of the working fluid (water) makes this single fluid heat operated system possible.

Three-Fluid Units

In 1928 I mentioned about seven units of the three-fluid variety. In addition to those previously mentioned we have others such as Bo Folke Randal (U. S. Patent No. 2,052,580 and others), Hoover (U. S. Patent No. 2,-278,378 and others), etc. The Platen Munters or Servel unit has been improved continuously for an advancing market. Some of the other units have been subject to considerable experimenting. The propane unit, having possibilities as an air conditioning unit, has been built experimentally in a large size. However, the two-fluid unit mentioned above has advantages for this application over the propane at the present state of our knowledge or development.

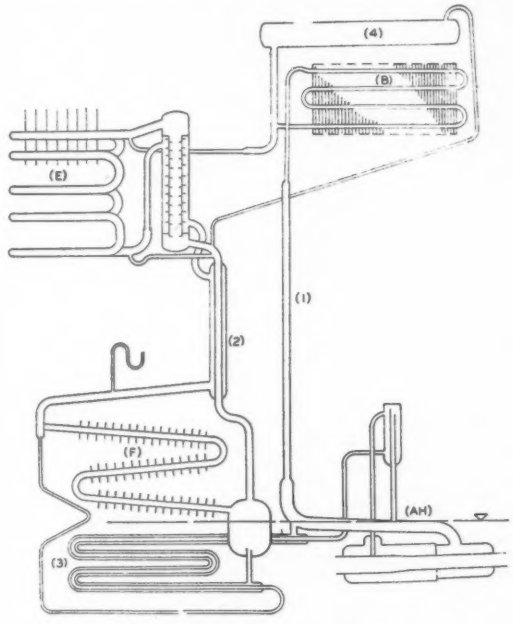


Fig. 6. Servel (Platen Munters System) unit.

Since 1928 many improvements have brought the Servel unit to its present position. The introduction of the two temperature evaporator, analyzer and hydrogen reserve or pressure vessel were big contributing factors in converting this unit from a water-cooled to an air-cooled unit. The unit as an example of the most successful of the three-fluid units is shown diagrammatically in Fig. 6. (AH) is the generator and liquid circulation system. Vapor from (AH) after passing in contact with rich solution in the analyzer passes through the rectifier (1) to remove more water vapor and into the condenser (B). From the condenser the liquid refrigerant passes into the evaporator (E) where it meets hydrogen weak in refrigerant from the absorber (F).

In passing through the evaporator the inert gas or hydrogen approaches saturation with ammonia at a low temperature in the low temperature part of the evaporator and at a higher temperature in the high temperature evaporator. This causes an increase in density which results in the hydrogen ammonia mixture circulating by gravity to the absorber (F) where it meets weak liquor from the generator system and ammonia is absorbed out of the hydrogen mixture decreasing its gravity again. The hydrogen weak in refrigerant and that rich in refrigerant circulate counter-current through the gas heat exchanger (2) to lessen loss of refrigeration. A liquid heat exchanger (3) is also used in the liquid circulation system. The hydrogen vessel (4) is inactive and filled with hydrogen at normal condenser temperatures. When the condenser temperature increases due to high room temperatures non-condensed ammonia vapor passes into the hydrogen reserve or pressure vessel displacing hydrogen

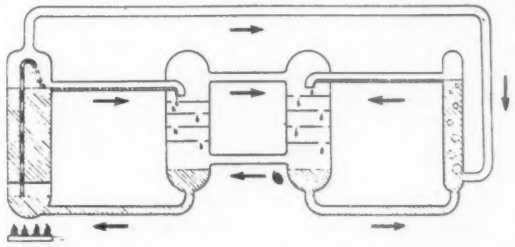


Fig. 7. Electrolux resorber cooling unit; ammonia-hydrogen-water.

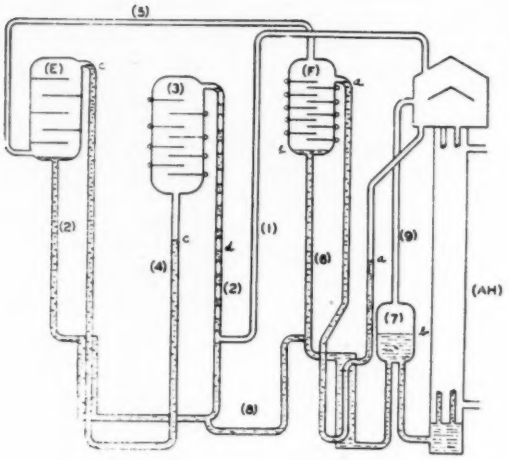


Fig. 8. Two-pressure, no-moving-part resorber unit.

into the gas circulating system and increasing the pressure in the unit to the point where condensation of refrigerant continues. Thus we have a means of maintaining pressure in the unit at the vapor pressure of the ammonia at the condensing temperature.

Other Units

The four- and five-fluid units mentioned in my previous paper remain as curiosities. There are numerous other cycles not mentioned above. For example, there are the units where ammonia is evaporated from a very rich solution to produce refrigeration and absorbed in a weak solution in the absorber. The very rich solution fed to the evaporator is produced by dissolving ammonia vapor from the generator in an intermediate solution. This type, or resorber unit, which can be made in the two- and three-fluid varieties, is shown diagrammatically in Fig. 7 as a three-fluid unit.

Absorption units constitute a field for the chemist from the point of view of the invention of both new refrigeration cycles and new fluids for these cycles. No cycle, however interesting theoretically, will be worth much without suitable fluids, e.g. the Servel air conditioning unit would not work with ammonia and water, the refrigerant and absorbent used in the Servel domestic refrigerator. Then after the invention of the cycle and choice or invention of the best fluids there is a long period of research and development before the necessary refinements and "know how" has been obtained. The absorption field is an interesting one which I recommend for research, and for fear that someone may feel all cycles have been invented, I would like to add one which occurred to me while writing this.

Resorber Type

The resorber type unit has been considered and worked on as a two-fluid unit using a mechanical pump for transfer of absorbent solution to the generator. It has also been used as a three-fluid unit with an inert gas for pressure equalizing. Why not build a two-fluid, no-moving-part resorber unit using a vapor lift pump? Such a unit is shown in Fig. 8. The height of the columns or traps would depend on the refrigerant and absorbent used. It is conceivable that after considerable research and development this unit might have successful commercial possibilities, and there are many other units yet to be invented. This unit, which is, as far as I know, new, would operate as follows:

Heat applied in the generator (AH) evaporates refrigerant from the solution and at the same time lifts solution to the higher pressure or level represented by the top of the generator. From here the vapor passes through pipe (1) meeting resorbent solution from the evaporator (E) in pipe (2) causing circulation in the resorber-evaporator circuit and absorbing in the returning solution from the evaporator. The heat of absorption is removed in the resorber (3) and absorption of generator vapors is completed. From the resorber the very rich solution passes through pipe (4) to the evaporator (E). Here refrigerant is evaporated from the solution, the vapors passing through pipe (5) to the absorber (F). The weakened solution in the evaporator returns through (2) to the resorber to be enriched. The vapors are absorbed in the absorber (F) and the absorber solution passes to the generator (AH) through pipe (6) and the container (7).

The absorber (F) and evaporator (E) are at low pressure and the generator (AH) and resorber (3) at higher pressure. The pressure differences are maintained by the columns a-a, b-b, c-c and d-d. Pipe (8) is for returning solution carry over and (9) is a vent.

Servel Unit 18 Yrs. Old

Devising a cycle like this is only a small part of the job. The Servel gas unit is now around 18 years old. We have been studying the gas air conditioning problem about nine years and just have what we feel is a satisfactory unit. Many of the other units I have mentioned have been studied and promoted for years. There are still many opportunities in the absorption field, but they take time, energy, money and patience to develop. I believe the colleges have missed a bet, particularly in the chemical research fields, in not taking many of these problems as research projects for master's and doctor's degrees.

Natural Gas to Moscow

A NEW 450-mile natural gas pipeline from Saratov to Moscow which will be completed next December will increase by five times the gas resources of Moscow and should eliminate many of the hardships of long cold winters. Saratov lies southeast of Moscow on the Volga River and the newspaper Pravda says that several thousand workers soon will be at work on the project.

In the past, most of Moscow's cooking has been done on gas stoves in apartment houses shared by several families but since the city's factories began working day and night to provide material for the Red Army, gas for private consumption has been scarce. When central heating broke down, the people were given metal wood-burning stoves. These heated their homes during the past three winters.

Radiant Gas Heating

An English authority gives his views on a phase of gas heating which has achieved success in new applications

BY DR. A. L. ROBERTS

University of Leeds

ALTHOUGH its general principles have been well understood for a long time, the subject of radiant heating has attracted additional attention during recent years because of spectacular results which have been achieved in novel applications. An outstanding example is the application of heating by radiation to the curing of paints, varnishes or lacquer coatings on thin metal surfaces.

Radiation and Convection

The term "radiant heating" applies to processes in which the heat is transferred directly as heat waves from a hot source to the material being heated, the atmosphere between the source and irradiated material playing little or no part in the heat transfer. In heating by convection, however, the rôle of the atmosphere is important, as the heat transfer is effected principally *via* the air or gases circulating between the hot source and the material to be heated. It should, however, be pointed out that in many of the so-called convectional ovens and driers the proportion of heat transferred by radiation is frequently considerable.

The most important difference between radiation and convection heating is that in the former case the rate of heat transfer is dependent on the difference of the fourth power of the temperature of the source and of the body being heated, whereas in the latter case it is broadly approximately proportional to the temperature difference.

The significance of this difference is illustrated by Fig. 1, which shows approximately the total rate of heat loss from a body of high emission coefficient (0·9) at various temperatures to its surroundings at room temperature, together with the separate components due to radiation and natural convection. It will be seen that at temperatures above approximately 300° F., the heat loss by radiation appreciably exceeds that by convection, and as the temperature rises the radiation increases much more rapidly than the convection component, becoming, for example, about four times greater at 1,000° F. At higher temperatures the difference rapidly becomes more marked.

Similar considerations apply to the rate of heat transfer to a cold body by radiation from a hot source, or by convection from the surrounding hot air or products of combustion. Where the source temperature is high, the rate of transfer by radiation greatly exceeds that by convection from gases at the same temperature. Whilst the transfer by convection can be materially increased by using forced circulation, the gas velocities required if the convection is to approach the radiation transfer may well be beyond attainment in practice.

Radiant heating is well established in the gas industry and many familiar appliances make full use of the principle, e.g. radiant panels and surface combustion units for space heating, and gas fires in which a large proportion of the potential heat in the gas is converted into radiant energy by flame impact on the refractory radiants. In gas fired furnaces heat transfer by radiation plays a major part.

Latent Possibilities

The success achieved in paint drying has, however, focussed attention on the possible application of radiant heating to new and wider fields. In this particular application, the high rate of heat transfer associated with radiant heat is turned to special advantage; for instance, the time of curing of certain types of paint is reduced to a matter of minutes from a matter of hours by ordinary stoving methods.

It should be realised that the remarkable results obtained are due not only to the use of radiant heating, but also to the concurrent development of paints specially suitable for treatment by radiation. The electrical industry has been largely responsible for this development which has come to be known as the infra-red process.

The term "infra-red" is unfortunate and has given rise to many misconceptions about the subject. It is really another term for heat radiation, and the process is an application of the well known principle.

All objects emit "infra-red" radiation or heat rays which lie beyond the red end of the visible spectrum. The heat waves emitted from gas heated sources such as radiant panels, surface combustion units, etc., are just as much "infra-red" as the waves from an elec-

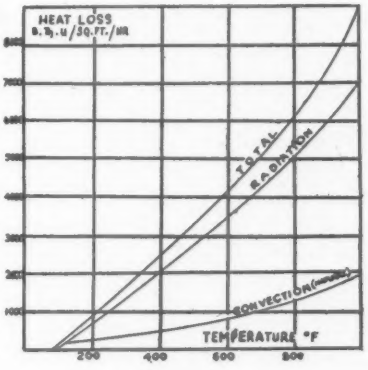


Figure 1.

tric tungsten filament lamp or electric radiator.

Wavelength of Radiation

Some consideration has to be given, however, to the wavelength of the radiation from these different sources. The wavelength of the radiation emitted by a hot body depends fundamentally upon its temperature; the higher the temperature the shorter the wavelength corresponding to the maximum intensity of radiation. This is illustrated by Fig. 2, which shows approximately how the energy emitted from hot sources at different temperatures is distributed with respect to wavelength.

For convenience it is assumed that the maximum intensity of emission is the same for each source. Curve A rep-

Reprint from *Industrial Gas Times* of an address to the Manchester Association of Gas Engineers.

resents the emission from a source such as the electrical "infra-red" (tungsten filament) lamp, which operates at 2,500° K. (4,000° F. approx.). Here the maximum intensity occurs at a wavelength of 1·2μ ($\mu = 10^{-4}$ cm.), and most of the radiation is confined between the limits of ordinary light and about 4μ.

Curve B represents the distribution of energy for sources operating at about 1,173° K. (1,650° F.) such as surface combustion units, gas fires and electrical radiators. In this case, the peak emission lies at about 2·5μ, and

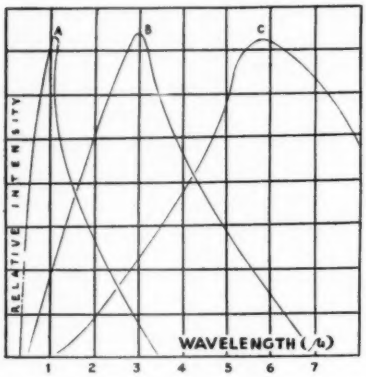


Figure 2.

the energy is distributed well into the longer infra-red wavelengths. Dull emitter sources such as medium temperature gas heated panel units operate at still lower temperatures (e.g. 620° K. or 660° F.) and the emission occurs at correspondingly longer wavelengths still (Curve C).

Fig. 2 shows that whilst the radiation from each of the sources named is the same in the sense that it consists of infra-red or heat waves, there are certain characteristic differences as regards wavelength distribution. How far these differences may be significant in practice is an interesting question. In paint drying, for example, claims are being made that short wavelength radiation is advantageous because it penetrates the paint film and in doing so is absorbed gradually, thus effecting uniform heating.

Selective Absorption

Some substances are known to be "selective" with respect to their absorption of radiation falling upon them, i.e. they will absorb energy in certain regions of the spectrum, whilst transmitting or reflecting the remainder. When such materials are treated by radiant heating, it seems likely that advantages might result as regards efficiency and speed of the process, or quality and finish of the product, by using a source whose radiation was most appropriate as regards wavelength to the material being irradiated.

There is no doubt, however, that in a large number of applications the quality of the radiation does not matter; the important point is to obtain the correct intensity.

The examination of these and other problems forms part of the programme of fundamental research on radiant heating now being carried out by the joint research committee of the Gas Research Board and the University of Leeds. The work involves the study of the emission characteristics of sources of radiant heat, together with the examination of the reflection and absorption properties of a wide variety of materials which offer possibilities of, or are already, being processed by radiant heat.

The equipment for this fundamental work includes an infra-red spectrometer, whilst practical tests on a larger scale are being carried out in cooperation with the Yorkshire industrial gas development centre, using a gas heated radiant tube unit installed in the fuel department of the University.

Radiant Heat and Gas

There can be no question but that gas heated appliances are very suitable as sources of radiant heat in a considerable number of existing applications. The main object of the fundamental research work is to establish the principles of the radiant heating process so that, with the necessary knowledge of the characteristics of both the radiant source and the material being heated, the process can be operated at maximum efficiency in each and every specific application. Special attention is also being paid to the possibility of improving the design and performance of gas heated sources, as well as their application in new fields.

A.S.T.M. Book of Standards

HEAVY demands for the 1942 Book of A.S.T.M. Standards and its Supplements occasioned by the war production efforts have necessitated advancing by a full year publication of the next book. Normally this would come out in November-December 1945 on the triennial basis, but the book will be issued in December 1944.

COOKING PARTY FOR NEWCOMERS

Plump Oregon turkey was the center of attraction at Portland Gas & Coke Company's annual "Holiday Foods" cooking party, guests at which were newcomers to the city. The turkey and all that goes with it were prepared on the CP ranges in "Hospitality House" where the party was held. While Grace Workman of the home service staff carves, Home Service Director Rita Calhoun dishes up "samples" for the newcomers, the first three of whom represent the states of New Jersey, Georgia and Illinois. Many of the guests were wives of war workers. Promotion for the party consisted entirely of space in "Newcomers' News," a local publication sent monthly to new families.

SALES PROMOTION POLICIES RECOMMENDED FOR GAS APPLIANCES AND SERVICES

THE Executive Board of the American Gas Association has recommended to the gas utility industry certain sales policies for their consideration in promoting the sale of gas appliances and gas service. These policies, which are offered as suggestions only, follow:

"It is believed that gas utilities must undertake and continue full responsibility for leadership in gas appliance sales in their respective communities to the end that the inherent superiority of gas as a fuel shall be maintained; accordingly the following recommendations are made:—

"1. That national, regional and state gas associations should cooperate with all similar national organizations in all allied fields.

"2. That gas utilities should perform the task of promoting the sale of new improved gas appliances to the point of assured customer acceptance.

"3. That as customer acceptance materializes, the activities of the gas utility should be continued in such a manner as to maintain continuing acceptance of gas service and to increase the flow of gas appliance sales through normal channels of distribution.

"4. That the gas utility should assume responsibility for gas appliance sales training of personnel (utility and dealer alike), utilizing the cooperation of gas appliance manufacturers.

"5. That the gas utility should assume responsibility for training dealers in installation and service techniques, utilizing the cooperation of gas appliance manufacturers.

"6. That the gas utility should keep dealers informed as to the increased merchandising opportunities offered to them in the gas appliance field, e.g., additional lines, new products, new rates, etc.

"7. That the gas utility should inform all concerned with home construction and financing on all matters having to do with gas equipment and gas service.

"8. That the gas utility should provide or make available to dealers facilities for financing gas appliance installment sales as attractive and advantageous as the utility's own.

"9. That the gas utility should initiate and promote appliance sales campaigns with cooperating gas appliance dealers.

"10. That home service and all other aids maintained by the gas utility should be made available to cooperating gas appliance dealers.

"11. That gas utility should provide full information as to its policies and practices so as to establish a relationship of mutual understanding and confidence with dealers."

TENNESSEE TO INCREASE RESERVES FOR 1265-MILE NATURAL GAS LINE

AT least 76,500,000 cubic feet of natural gas which is now being wasted daily in Texas, or which is without a market, are expected to be conserved under proposals filed with the Federal Power Commission by Tennessee Gas and Transmission Company which has just placed its $54,000,000 Texas-West Virginia pipe line into operation.

Gardiner Symonds, president of Tennessee Gas, petitioned the Federal Power Commission for permission to connect the line with eleven Texas oil and gas fields now having no outlet, and stated that the maximum daily take may run as high as 151,000,000 cubic feet a day. The company has asked for an early hearing.

Under the proposals filed by Tennessee Gas, a minimum of 42,000,000 and a maximum of 72,000,000 cubic feet of these petroleum vapors would be recovered every day and put to economic use. The gas would be co-mingled with the company's present supplies being pumped to the Appalachian area. In addition, Chicago Corporation is installing facilities at its Wardner plant to gather and deliver 12,000,000 cubic feet daily for pipe line use.

The reserves of Chicago Corporation are estimated at substantially in excess of two trillion cubic feet, or enough for at least thirty-three years, based on annual withdrawals at a rate of 75 per cent of the Tennessee line's capacity. But the proposed facilities will aid in assuring Tennessee "a continuous and adequate supply to its customers," the petition said.

A. G. A. Rate Service

One of the most useful and valuable activities of the American Gas Association is the preparation of a comprehensive rate service. This service is invaluable in that it is the only one of its kind showing in detailed form gas rate schedules in actual use.

Issued in loose-leaf form, the rate service contains over 500 pages (8½" x 11") of complete and accurate information relative to gas rate schedules. It is leatherette bound and is kept up-to-date by monthly supplements.

Gas rates for hundreds of companies over the entire United States and Canada are reported in such detailed and excellent form that they should be of great assistance to rate-making departments in the shaping of new rates and industrial and commercial departments in evaluating sales comparisons with other companies.

In addition to all types of gas rate schedules, the service includes lists of communities supplied with gas, the companies supplying these communities and the heating value and type of gas served. Companies subscribing to this service have found it to be indispensable. Considering the value, the cost is nominal.

Subscriptions to members (including supplements): $12.00 per year
To non-members: $15.00 per year

Robomb Damage

BRITISH utilities in London face the problem of repairing service connections and other facilities damaged by the robomb blitz. But the robombs caused chiefly surface damage, as distinguished from the huge craters which the Luftwaffe made in the 1940 blitz, tearing up London's streets and shattering mains and cables in ghastly fashion. On the threshold of winter, today, Britain is confronted with the task of rebuilding or repairing nearly one million homes damaged by the robombs—nine out of ten in the London area.

But twice-tried London during this war has already proved that her valiant citizens will be ready when the lights go on again. Certainly her gas undertakings have not faltered.

Your future prosperity depends on your purchases of War Bonds regularly and under the payroll savings plan.

NATURAL GAS INDUSTRY ATTAINS PEAK LOADS IN 1943

THE demand for natural gas expanded further in 1943 in response to greater industrial and other wartime activities. Marketed production was 3,414,689,000,000 cubic feet, 12 per cent more than the 1942 record, according to the Bureau of Mines, United States Department of the Interior.* Gains were recorded in all producing States except six whose output and available gas reserves are small. The output of each of the leading producing States—Texas, Louisiana, and California—increased 13 per cent over 1942, and collectively, these States furnished 67 per cent of the total United States production in 1943. It is estimated that marketed production in 1944 will be 9 per cent greater than in 1943.

Trends Vary

Consumption (marketed production less exports) increased 12 per cent from 3,044,773,000,000 cubic feet in 1942 to 3,403,479,000,000 in 1943. The major classes of consumers increased their takings over 1942 as follows: Domestic 6 per cent, commercial 12 per cent, and total industrial 13 per cent. The trends of gas utilization by different industries varied widely, as indicated by declines of 6 per cent by carbon black manufacturers and 20 per cent by portland-cement plants; in contrast to gains of 23 per cent by miscellaneous industrial users and 26 per cent by electric public-utility power plants (including minor but indeterminate amounts of manufactured gas) as reported by the Federal Power Commission.

The major classes of consumption were as follows: Domestic, 529,444,000,000 cubic feet (16 per cent of total consumption); commercial, 204,793,000,000 cubic feet (6 per cent); field use 780,986,000,000 cubic feet (23 per cent); carbon black manufacture 315,562,000,000 cubic feet (9 per cent); fuel at petroleum refineries 243,584,000,000 cubic feet (7 per cent); and other industrial uses including gas used at public-utility power plants, 1,329,110,000,000 cubic feet (39 per cent).

The average value of gas at the wells was 5.2 cents a thousand cubic feet compared with 5.1 cents in 1942. Values were higher, or unchanged, in all leading States except California. The average value at points of consumption decreased 0.4 cent to 22.3 cents a thousand cubic feet. Domestic consumers paid an average of 0.7 cent a thousand cubic feet less for gas in 1943 than in 1942, commercial consumers 0.9 cent less, and total industrial (except field) users 0.3 cent more. Average consumption per domestic and commercial meter was 5 per cent larger in 1943 than in 1942.

Mixed Gas Users Decline

Of the 10,353,870 domestic and 811,090 commercial consumers in 1943, 2,489,100 and 133,130 respectively used mixed gas. The decline from 2,514,460 domestic and 138,040 commercial consumers using mixed gas in 1942 resulted from transfer of a large group of meters in New York State from mixed gas to manufactured gas in 1943. The amount of natural gas used with manufactured gas increased 10 per cent in 1943 over 1942 (84,853,000,000 cubic feet compared with 77,259,000,000).

Exports to Mexico increased 29 per cent from 8,572,000,000 cubic feet in 1942 to 11,079,000,000 in 1943. Shipments to Canada were 131,000,000 cubic feet in 1943 compared with 130,000,000 in 1942. The interstate movement of natural gas (including exports) continued its rapid growth in 1943 to exceed 990,000,000,000 cubic feet, an average of 2,714,000,000 per day.

There were 2,290 gas wells reported drilled in 1943 compared with 2,597 in 1942.

* Prepared under the supervision of A. G. White, Petroleum Economics Division, Economics and Statistics Branch.

CHARGE TO "ANCIENT SUPPLERS"

MANY in the gas industry who have not spent the required ten years apprenticeship or who, for other reasons, have not received bids to join that institution of growing fame—the Gild of Ancient Supplers of Gas Appliances, Skills, Gins, Accessories and Substances—may have wondered about its purposes. To lay the ghost of rumor which may or may not have been bandied about by the ill-informed, the A. G. A. MONTHLY herewith publishes for the first time the "Charge to New Supplers" composed and delivered by C. Edwin Bartlett, Mayor of that worthy organization. It reveals some of the loftier sentiments behind the Gild's conception.

The Charge:

"Brethren, it is with pleasure we welcome you to our fellowship. Since gas was first turned on to bless mankind and lighten his burdens it has been made possible only by the work, handicraft, skill and diligence of worthy men such as are now a part of the fellowship to which you have been admitted and to which you will from now on contribute of your experience and knowledge.

"In all of life's relationships and activities there must be created, fostered, encouraged and guarded high standards of honor and performance. In any group of men there must be those who appreciating these standards seek to further them and preserve them by precept and conduct.

"These brethren of this Gild united for such purposes deem it wise that until one has demonstrated his adherence to these ideals for a period of at least ten years, he be not eligible for membership in this Gild.

"You having worthily served the cause for the prescribed time and having been deemed worthy of admission, are welcomed to all the rights and privileges of this Gild and are expected to do your full share in the advancement of the purposes of this Gild.

"That you may have knowledge of these purposes and that your resolution to advance them may be strengthened by open acknowledgment of your resolution, I shall now administer unto you the Gild Oath. Say your name and repeat after me—

" 'In the presence of the Great Council and the Brethren here assembled, I most solemnly affirm that I will do constantly everything in my power and of which my conscience will approve to influence the greater use of gas.

" 'To those who place their trust in me I shall be honest and loyal, appreciating the confidence placed in me as entrusted not only to me but also to my honorable brothers of this Gild who would be injured were I through lack of diligence or integrity to fail in this respect.

" 'To my Brethren of this Gild I shall impart upon request or voluntarily, should I deem it wise, any information which is seemly to my various relationships and not given to me in confidence, which will help them in earning their livelihoods, or in serving this Gild or its objects.

" 'I will at all times stand ready to aid any needy Brother of this Gild to the extent of my ability.

" 'At all times and in all places I will stand ready to rally to the support of this Gild if it is attacked, maligned, discredited, or its aims, objects or existence criticized.' "

Natural Gas As Chemical Raw Material

DR. E. P. SCHOCH, who for years has been conducting research at the University of Texas looking to the possibility of making plastics and other substances from natural gas through an electric-discharge process, expresses the belief that success of the method, which has been patented in the state's name, is in sight. Using electric power at off-peak hours, acetylene would be produced from natural gas. Then from acetylene a wide range of synthetic materials, including rubber, could be made.

Dr. Schoch hopes research at the university will develop a method by which casinghead gas, now wasted in large quantities with the production of oil, can be turned into useful channels. Casinghead gas is produced under low pressure and in many fields is burned to get rid of it.

"I see great possibilities for creating, through private enterprise, a wide field of postwar employment in the natural-gas chemical industries," said Dr. Schoch.

A. G. A. Gets Orchid for Manpower Study

THE War Manpower Commission has commended the American Gas Association for developing gas industry case histories which have provided valuable information on the manpower problem. W. O. W. Lee, chairman, Industry Associations Committee, Bureau of Manpower Utilization, on November 21 wrote as follows:

"Thank you for the excellent set of case histories your Association and its members have developed from and for your industry. It is so full of interest to even a layman that I have not only read it through but have gone back and picked up spots here and there which were of outstanding interest to me.

"It is my sincere desire and belief that this information in the hands of the operators within your industry will prove a most valuable contribution to the war effort and the efficiency of your industry after the peace."

Surplus War Property

THE Commanding General, Quartermaster Depot, Jeffersonville, Indiana, has announced the acquisition by that Depot of many items of surplus war property. As contract terminations take place, when the European War is over, certain raw materials and work in process used in the manufacture of these items will be available for purchase. The list is too long to reproduce here but further details can be secured by communicating directly with the Officer in Charge, Inventory Disposal Section, Contract Termination Branch, at the address given above. Examination of the list by the American Gas Association indicates that some of the material should prove interesting to member gas companies for shop work, repair and maintenance, etc.

Gas Measurement Course Proceedings Published

PROCEEDINGS of the 1944 Southwestern Gas Measurement Short Course held at Norman, Okla., June 6-8, were recently published in book form. Covering a vast amount of material on many types of meters, regulators, pressure boosters, automatic controls as well as operating information on many phases of gas measurement, this is indeed a valuable addition to any gas man's library.

Indicating the value placed on the material presented, 545 people from 25 states enrolled in the 1944 course which was conducted by the College of Engineering, University of Oklahoma, assisted by the Corporation Commission of Oklahoma and Oklahoma Utilities Association. Max K. Watson, Canadian River Gas Co., Amarillo, was chairman of the General Committee in charge of the course.

The printed book, which is well illustrated, makes up to more than 275 pages. It is published as a bulletin of the University of Oklahoma and may be obtained by writing W. H. Carson at the University in Norman. The price per copy is $1.50 plus a mailing charge of 25 cents.

Purchasing Agents To Meet

THE Public Utility Purchasing Agents and Stores Men will hold a two-day conference at the William Penn Hotel in Pittsburgh, on February 1 and 2. Edward Falck, director of the Office of War Utilities, representatives of manufacturers, and stores and purchasing men will be on the program to discuss purchasing and stores problems. This will be a combined meeting of the gas and electric industry and an interesting program is being arranged.

If you have not received an invitation direct, kindly write to C. F. Ogden, The Detroit Edison Company, 2000 Second Avenue, Detroit, Michigan, for registration cards, which include reservations at the William Penn Hotel. It is important that reservations for hotel accommodations be made as soon as possible and, if desired, these can be made direct.

Natural Gas Meeting

THE annual spring meeting of the Natural Gas Department will be held in Cincinnati on Monday and Tuesday, May 7 and 8, 1945 at the Hotel Gibson.

Many important subjects are already on the program.

It is urged that members make reservations as soon as possible direct with the hotel by writing Miss Ann Kroger, sales manager, Hotel Gibson, Cincinnati 1, Ohio.

"E" Award to American Meter Company

FOR "great accomplishment in the production of war equipment," American Meter Company's Philadelphia plants were awarded the Army-Navy "E" on November 27. The presentation was made to the employees at Town Hall, Philadelphia.

Norton McKean, president of American Meter Company, presided as chairman. In his brief acceptance address, William G. Hamilton, Jr., assistant manager, Philadelphia, stressed the loyalty and patriotism of fellow workers whose efforts had brought recognition by the War and Navy Departments.

It's our war. Let's fight it now. Buy more War Bonds and send your dollars into the fight.

Convention Calendar

JANUARY

10 •New England Gas Association, Operating Division, Boston, Mass.
10 •A. G. A. Midwest Personnel Conference, Kansas City, Mo.
11-12 •American Management Association, Waldorf-Astoria Hotel, New York, N. Y.

FEBRUARY

8-10 •A. G. A. Domestic Gas Research Conference, Statler Hotel, Cleveland, Ohio
14-15 •Pacific Coast Gas Association, Accounting Conference, Los Angeles, Calif.
14-16 •American Management Association, Palmer House, Chicago, Ill.

MARCH

6 •A. G. A. Southwest Personnel Conference, Shreveport, La.
6- 7 •Southern Gas Association, Second War Conference, Galvez Hotel, Galveston, Texas
7- 9 •West Coast Domestic Gas Research Conference, Amassador Hotel, Los Angeles, Calif.
12-13 •American Management Association, Insurance Conference, Hotel New Yorker, New York, N. Y.
21-22 •Pacific Coast Gas Association, Accounting Conference, San Francisco, Calif.
28-29 •Pacific Coast Gas Association, Transmission Conference, Fresno, Calif.
29-30 •A. G. A. Industrial & Commercial Gas Conference, Commodore Perry, Toledo, Ohio

APRIL

4- 6 •A. G. A. Distribution Conference, Stevens Hotel, Chicago, Ill.
4- 6 •A. G. A. Motor Vehicles Conference, Stevens Hotel, Chicago, Ill.
9-10 •Midwest Gas Association, Spring Convention, Hotel Fontenelle, Omaha, Nebr.
10-12 •A. G. A. Accounting Conference, Netherland Plaza, Cincinnati, Ohio

MAY

7- 8 •A. G. A. Natural Gas Department, Annual Meeting, Hotel Gibson, Cincinnati, Ohio
7-11 •National Fire Protection Association, Annual Meeting, Palmer House, Chicago, Ill.

JUNE

4- 6 •A. G. A. Joint Gas Production and Chemical Conference, Hotel Pennsylvania, New York, N. Y.
19-22 •Canadian Gas Association, Victory Convention, Murray Bay, Quebec

Accounting Section

C. E. PACKMAN, Chairman | E. F. EMBREE, Vice-Chairman | O. W. BREWER, Secretary

Accounting "Men of the Year"

C. E. Packman, Chairman Accounting Section
E. F. Embree, Vice-Chairman Accounting Section
O. H. Ritenour, Chairman Advisory Committee
L. E. Reynolds, Coordinator, General Activities Group
W. D. Virtue, Chairman, General Accounting Committee
O. H. White, Chairman, Materials and Supplies Comm.
C. A. Locke, Chairman, Property Records Committee
F. Freer Jr., Chairman Taxation Accounting Committee
Henry J. Johnson, Coordinator, Customer Activities Group
John Roper, Chairman, Customer Accounting Committee
C. E. Rowe, Chairman, Customer Collections Committee
J. G. Ross, Chairman, Customer Relations Committee

Men who head up American Gas Association committees in 1945. Scope of their work is outlined on opposite page.

The fourth year of World War II finds the accountants of the industry resolutely bearing the necessary, though less colorful, burdens that fall in different measure upon those who man the home front.

Accounting for the unprecedented volume of output being demanded of plant facilities which cannot be expanded; groping through the uncharted jungles of wartime tax philosophies and their imposition upon their companies; seeking to absorb and master the problems of a scheme of rate regulation which has placed accounting in a predominant, if not almost final and conclusive position; puzzling over the meaning of and the answer to renegotiation; searching ever for new and more efficient methods to solve the engima posed by dwindling manpower resources; pondering (through surely this must be in lieu of sleep) over what it all means now and what much of it will mean in the postwar era,—these are only a few of the things with which the accountants of this period must wrestle.

When, on top of all this, these same persons can stretch their physical and mental resources to advance the interests of their country, their companies, and their industry by cheerfully contributing their services to that mutual effort embodied in the activities of the Accounting Section of the American Gas Association, surely they are doing their part in the common effort.

That you may know of the leaders in this effort for the current Association year, their pictures and an outline of the particular phase each directs is reproduced in this issue of the Monthly. It is regretted that like recognition cannot be accorded the scores of others who collectively, comprise the Accounting Section.

Managing Committee

Manages and directs the activities of the Accounting Section.

Chairman—C. E. Packman, Middle West Service Company, Chicago, Ill.

Advisory Committee

Advises and assists the Section Chairman and Managing Committee in planning and carrying out the work of the Accounting Section.

Chairman—O. H. Ritenour, Washington Gas Light Company, Washington, D. C.

Program Committee

Reviews and approves all proposed activities of the Accounting Section.

Formulates plans and programs for Accounting Section Conferences, Section meetings at Annual Conventions and Natural Gas Convention.

Chairman—C. E. Packman, Middle West Service Company, Chicago, Ill.

Editorial Committee

Obtains worthwhile articles from Accounting Section Committees for publication in the A. G. A. MONTHLY.

Reviews said articles as well as Accounting Committee reports, and either approves same or informs the Advisory Committee and the Chairman of the Section of objectionable features.

Chairman—E. F. Embree, New Haven Gas Light Company, New Haven, Conn.

Planning Committee

Reviews Accounting Section organization structure and submits to the Advisory Committee for their indorsement the names of individuals proposed for the positions of Co-ordinator of the General Accounting Activities Group and Customer Accounting Activities Group, Chairmen of the Group Committees and personnel for the next succeeding Administration year, in so far as practical.

Chairman—E. F. Embree, New Haven Gas Light Company, New Haven, Conn.

Nominating Committee

Recommends candidates for Chairman and Vice-Chairman of the Section.

Chairman—O. H. Ritenour, Washington Gas Light Company, Washington, D. C.

GENERAL ACTIVITIES GROUP

Coordinates, promotes, and directs all activities of an accounting nature other than Customer Accounting.

Holds organization and other meetings and conferences as required.

Reviews and assigns proposed subjects to working Committees.

Proposes new activities.

Co-ordinator—L. E. Reynolds, The Connecticut Light & Power Company, Hartford, Connecticut

General Accounting Committee

Studies and reports on any matters of an accounting nature other than Commercial, not within the scope of other Committees of the General Accounting Activities Group.

Studies and reviews practical application of general accounting principles so as to have clear available facts regarding such matters for use by executives and department heads.

Chairman—W. D. Virtue, Public Service Co. of Colorado, Denver, Colorado

Materials and Supplies Committee

Studies problems involved in accounting for materials and supplies.

Chairman—O. H. White, Central Illinois Public Service Co., Springfield, Ill.

Property Records Committee

Studies problems involved in connection with Property Records.

Studies methods and systems of obtaining original cost and maintaining records.

Determines extent of details necessary to meet fundamental uses of record and requirements of regulatory bodies.

Chairman—C. A. Locke, Kings County Lighting Company, Brooklyn, New York

Taxation Accounting Committee

Studies accounting procedures and practices resulting from tax requirements.

Is of such service to member companies as may be requested.

Chairman—F. Freer, Jr., Public Service Electric & Gas Company, Newark, N. J.

CUSTOMER ACTIVITIES GROUP

Coordinates, promotes, and directs all activities relating to commercial office accounting and related activities.

Holds organization and other meetings and conferences as required.

Reviews and assigns subjects to working committees.

Proposes new activities.

Co-ordinator—Henry J. Johnson, United Light & Power Service Company, Davenport, Iowa

Customer Accounting Committee

Studies methods and problems relative to customer accounting.

Studies mechanical office equipment and application to customer accounting.

Chairman—John Roper, Washington Gas Light Company, Washington, D. C.

Customer Collections Committee

Studies problems relative to customers' credits and collections.

Studies methods of handling cash receipts and their disposition.

Studies training programs for employees in collection activities who come in contact with the public.

Chairman—C. E. Rowe, Consumers Power Company, Jackson, Michigan

Customer Relations Committee

Studies and reports on matters relating to the duties of employees working in or out of accounting and commercial offices.

Studies and considers problems of personnel for customer relations group employees.

Chairman—J. G. Ross, Rochester Gas & Electric Corp., Rochester, N. Y.

Done With Gas

OFF on a shopping tour, an Elizabeth, N. J. woman was far uptown before she realized that she had left coffee boiling on the stove. Rushing home, she found that a tramp had entered the house, poured himself a cup of coffee, prepared a peanut butter sandwich which he was munching in the backyard. A considerate fellow, he had turned off the flame under the coffee.

A National Program for Sales Training

R. E. Williams

BY R. E. WILLIAMS

Chairman, A. G. A. Committee on Selection and Training of Salesmen

MODERN specialized personnel training will be just as important to the gas industry in its battle for postwar markets as military and naval training has been to our armed forces in paving the way to decisive victories on world battle fronts. An uninformed employee, a mediocre, ineffective salesman or an unenthusiastic, untrained dealer will prove a definite liability to us at a time when we shall need every bit of assistance that we can muster.

The answer is clear—we must train our general employees, our sales personnel and our dealer sales people *now*, before our battles begin.

Servel Donates Program

Your Committee on Selection and Training of Sales Personnel has undertaken a two-fold assignment. Its first task, that of providing an adequate program for the selection of sales personnel, has been lightened very considerably through the cooperation of Servel, Inc., who have made Dr. Robert N. McMurry's comprehensive, workable program for the Selection of Gas Appliance Salesmen available to the gas industry. If you have not enrolled your sales supervisors in the training clinics to be provided by Servel, Inc. to equip them to make effective use of this excellent program, please do so at once. Be certain that your sales manager and sales supervisors can put the program into operation with the first prospective salesman that you interview. Thus you may set the stage for effective training by insuring careful selection of sales personnel. Remember that even the best training program obtainable cannot produce good salesmen unless there is good material to start with. Our scientific prowess not withstanding, "we cannot make a silk purse out of a sow's ear."

Once we have selected the best potential sales personnel available, we must be prepared to train them so that we may enter the postwar selling arena with a staff of alert, informed, aggressive gas appliance salesmen. But we dare not stop there. In addition to carefully selected and well-trained gas company sales personnel, we must see to it that our gas appliance dealers are provided with assistance in the training of their salesmen. And, finally, we must be certain that all gas company employees, particularly customer contact employees, are well informed as to gas company practices and policies and that they know the how and why of building gas load.

After a careful survey and evaluation of all of the factors involved in the building

of an aggressive organization to promote the sale of residential gas appliances, and to build gas load, your committee has gone to work to purchase an industry-wide program for indoctrination and sales training, comprising the following features:

I. Basic training in "Fundamentals of the Gas Industry," to be required for all residential appliance salesmen and to be strongly recommended for the training of other gas company personnel, particularly customer contact employees. This course to be organized in three units along the following lines:

Unit 1—"Gas—the Fuel"
- Historical sketch of the industry.
- Types and composition of fuel gases.
- Production, transmission and distribution of gas.
- Utilization of gas.

Unit 2—"Gas—the Service"
- The gas company as a public servant.
- Maintaining good relations with the public.
- Providing friendly service in the home.
- Building good will through customer contacts.
- Representing the company.

Unit 3—"Building the Gas Load"
- Load-building a part of every job.
- Keeping a lookout for leads.
- Developing "sales mindedness"
- Helping to promote appliance usage.
- Making friends for the Company.

II. Specialized training in "Residential Gas Salesmanship," to be required for all residential gas salesmen and to be recommended for the training of dealer sales personnel. This course to be built in six units to include the following subjects:

Unit 1—"Win Confidence Quickly"
- Correct selling methods do increase sales.
- Start with the right approach.
- Find out each customer's specific needs.
- How to get people to listen to you.
- How to get people to believe you.

Unit 2—"Sell the Service"
- What do people really want?
- Sell convenience, cleanliness, economy and beauty of modern gas appliances.
- Sell the idea of coordinated gas kitchens.
- Sell the benefits of gas for the 5 Big Jobs.

Unit 3—"Show and Explain"
- Know gas appliances thoroughly.
- "Sales slant" your demonstrations.
- Show how the appliance performs.
- Explain why it will benefit the customer.
- Sign up the easy ones.

Unit 4—"Complete the Sale"
- The average customer hesitates before buying.
- Your best move is to keep on selling.
- Personalize the benefits to the customer.
- Make price lead to a close.
- Close the normal sales.

Unit 5—"Close the Hard Ones"
- Expect resistance and prepare for it.
- Handle difficult customers smoothly.
- Take awkward situations in stride.
- Use objections to help the sales.
- Choose the correct closing method.

Unit 6—"Plan for More Sales"
- Sales manage your own time—it pays.
- Use the telephone wisely to build sales.
- Systematize your prospect hunting.
- Pick up live leads from five sources.
- You can—if you will.

Dr. Robert N. McMurry, Servel sales training consultant, giving high spots of selection program at one of the country-wide regional meetings.

III. "Specific Product Training" will not be provided by the Committee but it is expected that gas appliance manufacturers will develop training material for use by utility and dealer salesmen on specific features and selling points of their products.

No course of training achieves maximum results unless it is easy to conduct and interesting as well as instructive to the participants and adaptable to local policies and conditions. After a careful survey of the field, your Committee has chosen Tradeways, Inc., to prepare and produce the training courses. This company has produced several previous courses for the American Gas Association and has had broad experience in similar work in more than fifty other industries. Both courses will be entirely new with respect to media, methods and contents and will be based upon nation-wide survey data and field experience.

In an effort to insure interesting and profitable meetings with opportunity for introduction of local material as required, each unit of both courses will be built in accordance with the following pattern:

Step I. To arouse interest and stimulate thinking among the participants a problem or sales case will be handed out be-

(Continued on next page)

SALES SELECTION AND TRAINING PLAN PRESENTED AT REGIONAL MEETINGS

AT a series of seven regional meetings held in key cities during November and December more than 750 top executives and sales managers received firsthand information on the four-part plan for the selection and training of domestic gas appliance salesmen sponsored by the American Gas Association in cooperation with Servel, Inc. Euthusiastic audiences heard complete details of the comprehensive program which is being directed by the Residential Gas Section's Committee on Selection and Training of Sales Personnel under the chairmanship of R. E. Williams, new business manager, Binghamton Gas Works, Binghamton, N. Y.

Meetings were held in the following cities: Boston, New York, Pittsburgh, Chicago, Kansas City, Dallas and Atlanta. All of them were one-day sessions with the mornings devoted to the Servel Salesman Selection Program and the afternoons scheduled for discussion of the Coordinated Gas Kitchen Program.

As a follow-up to the announcement meetings, Servel is arranging a series of three-day intensive training clinics on the new program for the benefit of interested utilities. These clinics, now being scheduled for early January, are designed primarily to train the gas company personnel assigned to the work of selecting and training gas appliance salesmen for postwar jobs.

Each of the announcement meetings was opened by Mr. Williams who outlined the over-all training program which is being offered to the gas industry. His remarks, which give a clear picture of the program, are reproduced in full in this issue of the MONTHLY.

Following Mr. Williams' presentation, George S. Jones, vice-president in charge of sales for Servel and president of the National Federation of Sales Executives, then explained his company's part in the new program and offered the assistance of his organization in the training and instruction work.

Presentation of the program was in charge of Dr. Robert N. McMurry, Servel's sales training consultant, who specifically covered every step from its need to its development as a complete plan. He highlighted his discussion with numerous charts illustrating the factors of prelim-

inary screening, the weighted application, and the patterned interview and described how they are to be used by gas companies. He also interspersed his talk with short skits to provide a striking contrast with old methods of "hunch hiring" as compared with the scientific selection procedure.

Participants in these skits were members of Servel's sales promotion staff who have been assisting Dr. McMurry in the research and formulation of the selection program.

R. J. Canniff, advertising and sales promotion manager for Servel, closed each meeting with a summation of the selection program and urged that each utility organize immediately for postwar action. Pointing out the practical merits of the plan, he emphasized the importance of an early start in selecting men for postwar selling jobs.

At each of the seven meetings specimen copies of the four Servel training manuals were given to those present and tentative requests handled for registration at the follow-up training clinics.

Group of sales executives who attended New York regional meeting.

Servel men taking part in a sales selection training skit.

fore each meeting together with a list of questions. The sales case will narrate incidents in which ideas brought out in the meeting should have been used. The participants will be requested to answer the questions before the meeting and discuss the answers during the meeting. The purpose is not to examine the participant, but rather to stimulate his interest in the meeting.

Step II. At the meeting to be conducted for each unit two sound-slide films will be presented, one of which will analyze the sales case, the other will dramatize the main points of the subject covered by the training unit. A Leader's Guide will furnish the group leader with suggestions and material for one or more meetings on each unit and will provide outlines for the introduction of local material as to company policies and plans.

Step III. A brief, clearly written, illustrated text will be handed to each participant at the conclusion of the meeting for each unit of the training program. The text will be punched for insertion in a standard ring binder to be retained by the participant for later study and reference. Provision for the inclusion of notes on local policies will be included, or separate sheets may be provided locally to meet company requirements.

Step IV. At the conclusion of each course, individual members of the group who successfully complete a written quiz will be awarded a certificate by the American Gas Association.

Every effort will be made to provide the participants with an overall picture of the gas industry and its aims in the indoctrination course, "Fundamentals of the Gas Industry." Obviously the treatment must be of a general nature to include the gas industry as a whole. The program, therefore, should be adaptable to use by natural, mixed and manufactured gas properties; local policies and practices may be introduced in a program of this nature even more effectively than by means of an individual local program, in most cases, because of the interesting sustaining nature of the program.

The treatment of the course, "Residential Gas Salesmanship," will be realistic and practical. It will deal directly with the important phases in the sale of residential gas appliances from the prospect list through the sale to the call back after installation. The New Freedom Gas Kitchen, CP Gas Ranges and Gas Water Heaters, Summer-Winter Air Conditioning and all other of the new gas appliance developments will be adequately treated in the program. Since the course, "Fundamentals of the Gas Industry," covers the elements of training particularly applicable to gas company employees no reference to load building will be included in the course. For this reason, dealer sales organizations will find the meetings and texts "right down their alley."

The production of the courses "Fundamentals of the Gas Industry" and "Residential Gas Salesmanship" will be undertaken by the Committee immediately upon assurance of industry support. A considerable investment is involved and before authorization can be given to begin work on the courses, the Committee must determine the probable number of enrollments that will be purchased. A brochure has been prepared which outlines the courses in considerable detail, indicates the plan for the sale of the training program to gas companies, and includes a form for preliminary and tentative commitments as to enrollments desired. If you have not received this brochure, write to the Residential Gas Section, American Gas Asociation, 420 Lexington Avenue, New York 17, New York, for a copy. In any event, be sure to fill out and return the tentative enrollment form as soon as possible so that the committee may proceed with the production of the program.

The program will not be produced until and unless a sufficient demand for it is in evidence. The Committee awaits the verdict of the gas industry with confidence that a prompt "go ahead" will be given and that the fatal slogan "Too Little, Too Late" will remain buried in the wreckage at Pearl Harbor.

NEW YORK-NEW JERSEY SALES MANAGERS' MEETING

MORE than sixty gas company sales managers and executives met at the Hotel Pennsylvania, New York, December 15, to participate in the New York-New Jersey Sales Managers' Round-Table Discussion sponsored by the A. G. A. Residential Gas Section. J. J. Deely, acting new business manager, The Brooklyn Union Gas Company, chairman of the Sales Council, was the presiding officer.

In the morning session, W. D. Williams, assistant general appliance representative, Public Service Electric & Gas Company, discussed "Postwar Possibilities of Home Service," from the angle of what home service can do in assisting the gas industry to maintain and increase gas loads in the highly competitive postwar era.

Roy E. Wright, director of gas sales of the NEGEA Service Corp., Cambridge, Mass., spoke on "Salesman Power." Basing his talk on surveys conducted in New England, he presented an interesting series of charts analyzing the number of meters assigned to domestic gas salesmen, the annual revenue produced and the number of appliance units salesmen should sell during the year.

Royal M. Alderman, vice-president, McCann-Erickson, Inc., New York, told "How to Capitalize on the CP Program." Mr. Alderman stated that gas appliances bearing the CP Seal should be constantly upgraded so that they will outperform competitive appliances, and that the superiority of the CP Seal should be stressed by the industry. He maintained that this seal as a certification of quality should continue to be advertised nationally as the gas industry's trademark, and that the background and of the objectives of the Certified Performance Program should be re-stated to all members of A. G. A. and A.G.A.E.M. in a new conception of its value in the postwar era.

Ernest R. Acker, president, Central Hudson Gas & Electric Corp., Poughkeepsie, New York, and chairman of the Gas Industry Promotional Development Committee, discussed this vital program and reviewed the progress made to date.

In the afternoon session, F. W. Williams, secretary, Residential Gas Section, reviewed the work of the Section's operating committees for the coming Association year.

Sidney Edlund, president, Sidney Edlund & Co., New York, nationally-known expert on marketing, delivered an address entitled "Organizing For Profitable Growth."

Rounding out the meeting an informal discussion entitled "Telling The Experts" was staged. W. B. Hewson, manager, publicity and advertising, The Brooklyn Union Gas Co., F. M. Houston, manager, domestic sales department, Rochester Gas and Electric Corp., and R. A. Malony, sales manager, The Bridgeport Gas Light Co., acted as the experts and asked the audience a number of interesting questions. Spirited discussion resulted and it is planned to enlarge upon this feature at the next meeting.

Wanted: Burner With a Past

LARGE Size Gas Burner, suitable for melting pot. Should be approximately 48 inches in diameter. Type formerly used under still will be satisfactory. Call 32, Daily Clintonian—*Want ad in the Clinton (Ind.) Clintonian.*

We don't know, Sir, what you are talking about.

The New Yorker.

Gas Targets in Food Service

BY ROY E. WRIGHT

Chairman, Food Service Equipment Committee

OVER the past two years the Food Service Equipment Committee of the American Gas Association has had three principle objectives for the accomplishment of which it is continually working. These general objectives are:

1. To awaken the gas industry to the reality of its true position in the food service field.
2. To increase gas appliance sales in this field.
3. To work toward improvement in construction, performance and safety of hotel and restaurant gas appliances.

Gas fuel has predominated for cooking in the food service field for a couple of decades. It is estimated that more than 85 percent of the cooking appliances in the food service establishments located on gas company lines were gas-operated. The long-continued use of gas for cooking and baking in this field had perhaps lulled many gas companies into a state of complacency that endangered the loss of this valuable gas load to the gas industry.

Competitive Fuels Gain

Because of this long-continued use of gas for cooking in this field many gas appliances had become old, antiquated, obsolete, and in poor condition. This made them vulnerable and easy targets for competitive fuel appliances.

Progressive research and developments were systematically and constantly conducted by competitive manufacturers, particularly by the electric manufacturers, while no comparable amount was done by the gas industry. Eventually this produced the expected results. New competitive fuel appliances, improving continually in construction, performance, appearance and serviceability, appeared on the market and made themselves felt. Especially was this true in counter appliances, fryers and bake ovens where the greatest inroads have been made in the gas load in the food service field.

The electric industry has spent large sums over the past few years in promoting and advertising the use of electricity in the food service field, much more for the same purpose than the gas industry has when comparing the volume of business served by the two industries. As a result, the electric industry has inspired the proprietors of food service establishments to believe that electricity is the modern fuel, the fuel of tomorrow while at the same time by inference created the idea that gas is an old, conservative, obsolete fuel.

Considering the limited investment, the small overhead needed to supply these accounts, the steady all-day year-around gas load, the large size of the average account and the satisfactory average rate, this is a highly desirable business for every gas company. The electric industry also realized the fine attributes of this load. The gains that they made prior to the war have only served to whet their appetite for more. The electric industry has slowly reduced electric rates for this service to the point where they are fairly comparable with gas in many communities. They plan to take further steps in this direction when their war loads are gone or reduced and they have idle generating capacities.

The electric appliance manufacturers are financially powerful. They have and will

WOMANPOWER REACHES THE TOP

BOTH political parties have their glamour girls in Congress, but the glamour girl of industrial gas sits in the front office and is doing a big job directing the manufacture and sale of industrial gas equipment that is used in war production plants and in making supplies for the civilian market.

Mrs. Sonya K. Zitzewitz is president of Mid-Continent Metal Products Co., Chicago. The National Machine Gas Burner Division is one of two divisions of this company each of which produces material essential to the war effort. National Machine standard and specially engineered industrial gas apparatus covers a wide range and is extensively used in every state and throughout Canada.

When Mrs. Zitzewitz's husband, Arthur F. Zitzewitz, a Lt. Col. in the Ordnance Department, left early in 1942 for the Mediterranean theater of war he asked his wife Sonya to take the responsibility of directing Mid-Continent Metal Products Co. At that time she was following the career of a successful homemaker and mother for their young daughter. However, business and industry were not new to her. Previously she had been active in the manufacturing confectionery business and had shown decided traits of aggressiveness and sales mindedness at the executive level. So she took the job. Now all her associates, after having worked under her direction for more than two years, declare that no better selection could have been made.

While Mrs. Zitzewitz is making her first two jobs the supplying of war plants with fine industrial and shipbuilding equipment and the running of her home, she is also developing far-reaching plans for her company to help in the reconversion of war plants and in enlarging peacetime production. She is anxiously awaiting the return of her husband, whose task it will be to carry out the postwar plans she is making. Sonya expresses only one fear. "He may fire me when he gets back," she says. Industrial gas men hope he won't!

The directing head of an important industrial gas equipment concern, Mrs. Sonya K. Zitzewitz, President of Mid-Continent Metal Products Co.

carry the major part of the research development, sales promotion, and advertising programs while in the gas industry this has to a degree been carried by the utilities. The electric industry believes it can make greater progress with less effort in the commercial cooking field than in the domestic cooking field and plans to spend the money necessary to accomplish this feat. Any success by the electric industry would necessarily be principally at the expense of the gas industry.

The Food Service Equipment Committee two years ago realized these facts, the dangers that beset the gas industry and the true position of the gas companies in this field. It was confident, however, that if the gas companies throughout the country could be awakened to the reality of their position in the food service industry and would take steps to correct the situation, they could not only successfully meet any attack but continue to make the business grow. It was on the strength of this conviction that the program of the Food Service Equipment Committee was set up. What has and is being accomplished to gain these objectives are outlined here.

Accomplishments

1. In an attempt to jar the gas industry out of its complacency two talks were given, one at the Industrial and Commercial Gas Conference at Detroit and one at the annual meeting of the American Gas Association in St. Louis. These talks were designed to emphasize the dangers threatening the loss of the gas commercial cooking load and point out some of the steps that should be taken to prevent it.
2. A Subcommittee on Local Surveys headed by Harry A. Sutton of Newark, New Jersey, circularized all gas companies asking each company to make a survey of its individual local food service customers. The letter outlined the need for this information, purpose of the survey, its value to the local gas company and the gas industry. Accompanying the letter was a Guidance Survey Form which the local company could use to make this survey or from which it could design a local survey form of its own.

   The purpose of having the survey made was to help the local company ascertain the type, kind, age and condition of the commercial cooking and baking appliances on its lines, the fuel used for each operation, what the customer thought of the gas company's service, where new loads might be added, what was needed to capture these new loads, the type and kind of food establishment and other pertinent information. From this information the local company would know what gas equipment must be replaced, where it was most vulnerable, where new load could be gained, what inroads had already been made by competitive fuel equipment, where they should concentrate their efforts, what their customers think of their service, and what, if any, consideration should be given to changing present company policies. No longer would it be necessary to shoot in the dark in a hit-or-miss fashion. The local company could make its shots count in a direction that would do the company the most good.

   A surprisingly large number of companies made the survey, are making it now, or plan to make it later. Many sent in summaries of their findings to the committee. They represented approximately 23 percent of the gas meters of the country, a remarkably fine response under today's conditions.

   This summary data has been reworked by the committee, has been interpolated to cover the total meters in the country, and the figures are being used by appliance manufacturers to help estimate needed output in the future. The information obtained from the local survey if properly analyzed and used will materially increase local sales for reasons already outlined.
3. Mr. Sutton's Subcommittee on Local Surveys also sent a letter to all member gas companies pointing out the need of rendering good service to food service customers, especially during the war when equipment is overworked, the part that poor service plays or will play postwar in the replacement of gas appliances by competitive fuel appliances, and the effect of service on the sale of appliances.
4. A Subcommittee on Engineering Selling, under Walter S. Anderson of Boston, prepared and sent out to member gas companies guidance material for a gas company Sales Training Program for commercial salesmen. The purpose of this material was to point out the qualifications needed of a man to meet competition in this field, how to train him, the technical information the man should know, and important steps in customer contact. This guidance sheet will be the basis of many local training methods as sales forces are rebuilt.
5. There is not available in collective print form modern up-to-date sales technical information on gas food service equipment and layout. To provide such sales and technical information commercial gas salesmen should have to successfully meet competition. Walter Anderson's Subcommittee on Engineering Selling prepared a tentative outline of the contents of a proposed Gas Food Service Equipment Manual. The purpose of the manual will be to help salesmen promote the use of gas in the food service industry. The Food Service Equipment Committee accepted the outline of the manual as proposed and voted to request a sum not to exceed $10,000 to underwrite the cost of preparing and editing the manual. This was approved by the Managing Committee of the Industrial and Commercial Gas Section following which the Executive Board gave final approval. The Committee assigned the editorial work to C. George Segeler, headquarters' staff utilization engineer, as editor and with suitable assistance now available work has begun.
6. After completion of the Manual, the Sales Training Subcommittee will prepare and send to the member gas companies suggestions on how the manual can be used most effectively for training commercial salesmen as well as applying it as an important direct sales help.

Dealer Cooperation

7. Mr. Sutton's Subcommittee on Local Surveys also assumed the task of impressing upon the gas industry the importance and need of good dealer understanding and cooperation to be successful in the food service field. There is now in preparation letters to be sent to member gas companies emphasizing these facts and suggesting how each local company can work for better dealer harmony in its community.
8. The Subcommittee on Publicity has been assigned the job of obtaining better gas publicity in the food service industry. This it is attempting to do by:
   (a) Obtaining publicity on new installations of special interest.
   (b) Working with the advertising committee of the Industrial & Commercial Gas Section to help provide material for the best possible national gas advertising for this field.
9. The Publicity Subcommittee proposes later to attempt to collect the names, addresses and titles of all individuals responsible for selecting the type and kind of appliances purchased by chain hotels, restaurants and drugstores and large kitchen equipment houses to have

Rich Load

● Reporting at a recent meeting of the Food Service Equipment Committee, Harry A. Sutton, chairman of the Subcommittee on Survey, revealed that $4,000,000 in new additional revenue awaits the gas industry in the commercial gas field when equipment needs are filled. Results based on a recent survey indicated that there are 125,000 commercial gas appliances which need replacement, and 168,000 needed for additional capacity or to replace other fuel-fired equipment. The survey brought replies from 51 companies in 22 states covering 4,500,000 meters and representing 23.7 per cent of the total gas meters in use. Since this 23.7 per cent represented an accurate cross-section of the gas industry, it was projected to 100 per cent of the meters to provide the national totals.

at Association headquarters for member companies interested in a particular job.

10. A subcommittee, known as the Commercial Appliance Study Subcommittee, under the leadership of Frank H. Trembly, Jr. of Philadelphia, was assigned the task of studying commercial food service appliance needs concerning possible improvements in the design, construction and efficiency. This subcommittee sent a questionnaire to more than 400 gas utilities, selected for their experience, requesting them to submit their detailed ideas and suggestions of the needs of postwar commercial gas appliances that would best challenge competitive fuels and meet the requirements of customers in this field. A substantial number of replies were received.

The uniformity of the suggestions received emphasized the need for certain changes and improvement. The results were carefully analyzed and summarized by the subcommittee. The exceptionally fine, illuminating and constructive report of this subcommittee, which is now in the hands of the appliance manufacturers, points out to them not only the needs but also the thinking and appliance desires of the best appliance brains of the gas industry. Because of the nature of the report, the Food Service Equipment Committee decided not to publish it at this time. Instead it was submitted to the Hotel Restaurant & Commercial Gas Division of A.G.A.E.M. and other interested manufacturers.

Appliance Standards

11. To further follow up the work of the Commercial Appliance Study Report the sub-committee, now known as the "Hotel and Restaurant Appliance Standards Committee", plans:

    (a) To suggest ways and means to raise the A.G.A. Approval Requirements suggesting greater consideration to construction and performance as well as safety using the Commercial Appliance Study Committee Report as a guide.
    (b) To consider the possibility of setting up Approval Requirements for warming tables, coffee and water urns, etc.
    (c) To work with the Approval Requirements Committee on hotel and restaurant appliances to determine the best methods of putting such suggestion into effect.
    (d) To consider the advisability of bringing out a deluxe line of commercial appliance similar to the CP domestic gas range.
    (e) To suggest any other means of increasing the quality of gas appliances in this field.

12. The Food Service Equipment Committee will attempt to further improve gas appliances by encouraging more research in the food service field by:

    (a) Formulating a systematic coordi-

(Continued on next page)

AMERICAN GAS ASSOCIATION

INDUSTRIAL AND COMMERCIAL GAS

ADVERTISING FOR JANUARY

The National Advertising Committee of the Industrial and Commercial Gas Section, J. P. Leinroth, chairman, and F. B. Jones, vice-chairman, announces that full page advertisements will appear in the trade and business magazines listed below during the month of January. These advertisements are prepared in cooperation with the Committee on National Advertising as part of the industry's national advertising campaign.

GENERAL MANUFACTURING

GAS—the most flexible fuel. BUSINESS WEEK (Jan. 13—⅔ page)

Bridgeport Brass Prides Itself on *GAS* Heat Treating Equipment. BUSINESS WEEK (Jan. 27—⅔ page)

GAS—the economical fuel . . . Let it save for you. MODERN INDUSTRY

From Bazooka to Baby Carriage—*GAS* is the Industrial Heating Fuel. INDUSTRIAL HEATING

METALS INDUSTRY

Bridgeport Brass Prides Itself on *GAS* Heat Treating Equipment. THE IRON AGE (Jan. 4) • STEEL (Jan. 8)

GAS-FIRED furnaces help produce the new Tubular Railway Axles. METALS AND ALLOYS

From Bazooka to Baby Carriage—*GAS* is the Industrial Heating Fuel. METAL PROGRESS

CERAMIC INDUSTRY

GAS—the economical fuel . . . Let it save for you. CERAMIC INDUSTRY

GLASS INDUSTRY

GAS—the most flexible fuel . . . GLASS INDUSTRY

CHEMICAL FIELD

Automatic precision control influenced Ault & Wiborg engineers to choose Industrial *GAS*. CHEMICAL & METALLURGICAL ENGINEERING

HOTEL AND RESTAURANT FIELD

GAS for Cooking, Heating and Hot Water, Serves this fine Chinese Restaurant. AMERICAN RESTAURANT • RESTAURANT MANAGEMENT

Cincinnati's Hotel Gibson uses *GAS* for all its famous Cooking and Baking. HOTEL MANAGEMENT

Cambridge (Mass.) City Hospital reports gratifying results in cleanliness, economy since switching to *GAS*. INSTITUTIONS

SCHOOL FIELD

GAS—the economical fuel . . . Let it save for you. NATION'S SCHOOLS

HOSPITAL FIELD

GAS—the economical fuel . . . Let it save for you. MODERN HOSPITAL

FOOD PROCESSING

GAS—the economical fuel . . . Let it save for you. FOOD INDUSTRIES

BAKING FIELD

This Pastry Shop—Saves 6 hours daily 12% in dough with *GAS*. . BAKERS HELPER (Jan. 13) • BAKERS WEEKLY (Jan. 8)

nated program of needed research, listing in order of importance those problems believed to be in need of solution, giving reasons and facts to substantiate the claims.

(b) Giving this program of needed research in the food service field to the Committee on Industrial Gas Research for its guidance.

(c) Selling the need of this research program to those directing the expenditures of research funds.

(d) Selling their own managements the need of contributing to the national promotional and research fund.

13. Encourage comparative performance tests on individual commercial gas appliances versus similar competitive appliances to bring out their weak and strong features and definitely to establish what they can or can not do.

14. A national summary of the customer survey made by the local companies has been complied by Mr. Sutton's Subcommittee on Local Surveys. This summary has been given to the Hotel, Restaurant and Commercial Gas Division of A.G.A.E.M. and will be available at Association headquarters for any interested gas utility. The summary shows the estimated total of the immediate appliance market in this field. It should tend to encourage these manufacturers to spend larger sums of money for research and sales promotion by pointing out the sales possibilities. It will also serve to show these manufacturers where their market is and enable them to know where to best direct their efforts.

It is my belief that the work of the Food Service Equipment Committee is contributing substantially to increased appreciation of the commercial cooking and baking load and of means toward fortifying and extending it. There is increased activity in research in this field and additional advertising space is being used by the Association.

It is gratifying to see the Hotel, Restaurant and Commercial Gas Division of A.G.A.E.M. expand its interest and activities and it is hoped that that division will become a strong factor in advancing the sale of modern appliances.

When adequate manpower is provided at Headquarters needed work in this important field can be accelerated.

In conclusion, I would like to pay tribute to the time and effort spent by the members of the Food Service Equipment Committee of the Association and its subcommittees who have made this tremendous task possible.

British Columbia ad packs punch.

Metal Research Data in New A. G. A. Bulletin

AN important new bulletin entitled "Research in Physical and Metallurgical Effects of High Speed Direct Air-Gas Heat on Metals" has been published by the A. G. A. Committee on Industrial Gas Research, John W. Batten, chairman.

The metallurgical laboratory work on which this bulletin is based was conducted by Selas Corporation of America, Philadelphia, Pa., under the sponsorship of the Committee on Industrial Gas Research. The editorial and publication work was done by the A. G. A. Testing Laboratories, Cleveland, O.

Commenting on this bulletin, Professor W. Trinks, in a letter to Selas Corporation of America, said:

"Permit me to congratulate your company and the American Gas Association upon the research work which was done in your laboratories under the auspices of the Committee on Industrial Gas Research of the Association. From visits to your laboratories I know that this research work has taken much time, effort, and money.

"The data on speed of heating, temperature distribution, and metallurgical properties are extremely valuable. It is hoped that, with the help of the Association, you may be placed in position to extend these tests to larger pieces and to the so-called tender steels.

"The heating curves are very similar to those obtained with induction heating. As a matter of fact, they are identical with those obtained by induction heating of extremely high frequency, because, with such a frequency, all heat is generated in the skin and is transmitted to the center by conduction only.

"Whenever Vol. I of 'Industrial Furnaces' is revised, these tests will be one of the cornerstones in the chapter on rate of heating."

ENGINEERING PROBLEMS OF HIGH TEMPERATURE FORCED CONVECTION HEATING

BY SLADE B. GAMBLE*

Lindberg Engineering Company, Chicago, Ill.

LESS than ten years ago forced convection furnaces established acceptance in the field for treating ferrous and nonferrous metals. Four years ago our company built its first furnace for high temperature forced convection heating with a thought that the advantages of forced convection at lower temperatures would be augmented in higher temperature applications. Actually, we have found many additional advantages.

Forced convection furnaces are now serving many war industries at temperatures up to 1750° F. Many engineering problems, not encountered in lower temperature furnaces, have had to be met and solved:

1. Circulating fans have had to grow by leaps and bounds—better than doubling in size (gas expansion).

2. Better methods for dynamically balancing larger fan wheels were required.

3. Fan designs for controlling warpage at high temperatures (so as not to destroy dynamic balance) were necessitated.

4. New constructional methods to facilitate necessary maintenance were called for.

5. Development of designs and materials for retention of furnace component alignments under high heat, were involved.

6. Problems of refractory endurance against erosion of 1750° gases at high circulating velocities have been met.

7. Tighter refractory constructions to confine 2500° combustion gases at fan pressure were needed.

8. Water cooling of shafts and bearings was necessary.

9. Interruption of the forced convection blast without stopping a hot fan (to aid comfort of operators while charging the furnace) had to be devised.

Despite these new engineering problems of high temperature forced convection heating, the reward in furnace performance has been abundant:

1. Spectacular improvement in production rates.

2. Great savings in labor.

3. Savings in space (one-third the space required for treating massive parts).

* Summary of remarks of Mr. Gamble at the 1944 semi-annual meeting of the American Society of Mechanical Engineers. Abstract prepared by "Steel Processing."

Technical Section

L. E. KNOWLTON, Chairman | LESTER J. ECK, Vice-Chairman | A. GORDON KING, Secretary

Work on Customers' Premises

Among those maintaining the pace set in the Technical Section organization meetings at the start of the current association year is J. M. Pickford, Northern Indiana Public Service Company, Hammond, Ind., chairman of the Distribution Subcommittee on Work on Customers' Premises.

This group takes no small part in the annual Distribution Conference and accordingly its plans contemplate, in addition to a constructive annual report, provision for a complete exchange of ideas and information at the 22nd Distribution Conference to be held in Chicago, April 4, 5, 6, 1945. The program committee of the Distribution and Motor Vehicle Committees will meet at Association Headquarters, January 16.

The following outline of activities and assignments has been abstracted from Chairman Pickford's challenging call of December 8 to members of his Committee.

J. Gordon King

BECAUSE the Work on Customers' Premises group undertakes to review such a wide variety of problems, ranging from mechanical to human, involved in customer contacts, etc., T. E. Darby, general service manager, Ohio Fuel Gas Company, recommended that the committee be subdivided, with three or four members who will concentrate on one problem in its various phases. The object is to develop new ideas, literature and experience for review and description at the Distribution Conference luncheon meeting. Thus, it is felt, the committee will be able to reach a more conclusive set of recommendations on such problems.

Following this suggestion, subcommittees have been set up, grouped according to geographical areas, with the following assignments:

I. *Scope of assignment*—Developments in Employee Training Programs, Training of New Employees, Upgrading of Old Employees, Serviceman as a Public Contact Man, Service Department Personnel—Qualifications, Quality Control of Customers' Service Field Work, Job Breakdown Sheet for Training Men; Suggested Improvements for Postwar Gas Appliances; Protective Devices for Pilot Light and Automatic Features on Appliances; Chimney Liners.

Subcommittee—D. E. Farmer, Portland Gas and Coke Co., Portland, Oregon, Chairman; C. A. Renz, Southern California Gas Co., Los Angeles; T. J. Conway, Minneapolis Gas Light Co., Minneapolis; J. P. Dresen, Public Service Co. of Colorado, Denver.

II. *Scope of assignment*—Recurring Service Calls, Define Repeat Call, How To Improve Customer Service, Tools for Servicemen, Training of New Employees, Upgrading of Old Employees, What Subcommittee Feels Is a Problem of Importance.

Subcommittee—T. E. Darby, The Ohio Fuel Gas Co., Columbus, Chairman; G. E. Ludwig, Michigan Consolidated Gas Co., Grand Rapids; M. S. Bolinger, Arkansas Louisiana Gas Co., Shreveport; C. A. Brown, Rochester Gas & Elec. Corp., Rochester; Donald Whitcomb, County Gas Company, Atlantic Highlands, N. J.

III. *Scope of assignment*—Free Work on Customers' Premises, Should Utility Render Complete Service?, Effects of Reduced Service Policy, Is the Gas Company the Best Qualified Agency To Render Appliance Service?, Application of Installation and Servicing Standards, Policies of Dealers and Installers, Semi-rigid Gas Connectors.

Subcommittee—L. S. Maehling, Equitable Gas Co., Pittsburgh, Chairman; Fred Batten, Binghamton Gas Works, Binghamton; C. S. Hazel, The Philadelphia Gas Works Company, Philadelphia; D. M. Steen, Queens Borough Gas & Electric Co., Far Rockaway, New York; T. J. Perry, Brooklyn Union Gas Company, Brooklyn.

IV. *Scope of assignment*—Analysis of Service Orders; Specific List of Gas Appliance Difficulties; Pilot Outage Problem, Use of Filters—Should Manufacturer of Appliances Incorporate in Design of Appliance?, Servicing Problems—Gas Water Heaters, Recommended Changes.

Subcommittee—J. Rian, Northern Indiana Public Service Co., Michigan City, Chairman; T. J. Spencer, Central Indiana Gas Company, Muncie; J. H. Erwin, Central Illinois Electric & Gas Co., Rockford; J. Hendrickson, Citizens Gas & Coke Utility, Indianapolis; C. L. Ruff, Michigan Consolidated Gas Co., Detroit.

J. M. Pickford

It is expected in these difficult and busy days that most of the work can be done by correspondence. It is not believed the assignment will prove burdensome, and the exchange of correspondence will be helpful to all.

Our progress report of last year aroused considerable discussion and a number of inquiries; one, referred to us by Association headquarters came from as far away as Sidney, Australia.

Our goal last year was to attempt to bring into stronger focus the serviceman and his problems and the need for considering them in the design of postwar gas appliances. There is every reason to expect that we can follow through on this phase this year.

Gas Strike

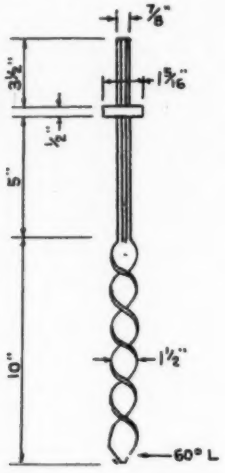
ALBERT SHELBY of Grand Island, N. Y., who drilled for natural gas to heat his house finds that he has a well which, according to the Associated Press, is expected to produce 100,000 cubic feet every 24 hours. This production would make it one of the largest wells on Grand Island.

WRINKLES

• This is the fourth in a series of "wrinkles" compiled by the 1944 Chemical Wrinkles Subcommittee of the Technical Section under the chairmanship of W. R. Fraser, Michigan Consolidated Gas Co., Detroit.

Spiral Asphalt Drilling Bar for Rotary Drill

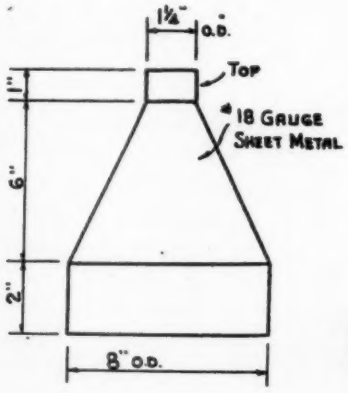
This spiral asphalt drilling bar is used in making bar holes in asphalt or asphalt topping on concrete base streets. The drilling bar is fabricated from ⅞" hexagon high grade tool steel. The bar is first cut to the proper length and then the spiral



portion of the drilling bar is shaped and tempered by the blacksmith. Sufficient metal is welded to the bar for the collar. Then the collar is machined to the proper size and shape in the lathe. Finally, the drilling bar is finished off with a file.

Metal Hood for Rotary Drill

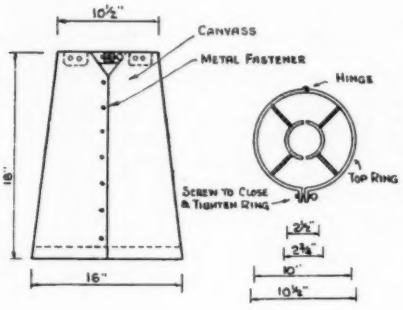
This metal hood is designed for use with a rotary drill when drilling bar holes.



Unlike the canvass hood for the paving breaker it does not fasten to the drill. The drilling bar is passed through the small opening at the top of the hood and then inserted into the drill. There is a small tolerance between this opening of the hood and the drilling bar to minimize flying dust from this point. In use the hood is pulled up on the bar, the bar placed at the point on the concrete to be drilled, and the hood then dropped to the street surface. This type of hood is easy to handle and eliminates practically all flying dust particles.

Canvass Hood for Paving Breaker

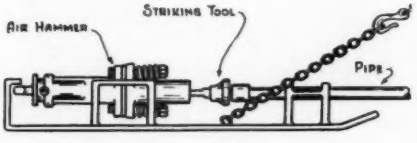
This hood is designed to fasten tightly to the paving breaker just above the point where the chisel is inserted into the breaker. It consists of a top ring of design as shown and a closed metal bottom ring



of ¼" steel rod. Canvas is attached to these two rings by means of metal fasteners as shown. A hood of this type with the large open top ring allows sufficient vision and it does a much better job in eliminating flying concrete than a canvas barricade.

Device for Driving Pipe

This device is a sled built with projections to properly hold a paving breaker in a horizontal position so that it can drive pipe in a horizontal direction. The paving breaker is fitted with a standard tamping



pad and the end of this pad is held tightly against the end of a length of pipe by means of the chains as shown. (This can be done by man power or winch power.) As the air is applied the tension presses the trigger on the gun. The sled moves forward as the pipe is driven.

Technical Section Conferences

THE chairman of the Technical Section, L. E. Knowlton, Providence Gas Company, Providence, R. I., announces that as a result of action taken at organization meetings of the Section, and approved by the Executive Board at its last meeting, the following arrangements have been made:

Distribution Conference

The Twenty-Second Annual Distribution Conference will be held at the Stevens Hotel, Chicago, Illinois, Wednesday, Thursday, and Friday, April 4, 5, 6, 1945. The chairman and vice-chairman of the Distribution Committee are T. H. Kendall, Equitable Gas Company, Pittsburgh, Pa., and J. H. Collins, New Orleans Public Service Inc., New Orleans, La.

Public Utility Motor Vehicle Conference

The Fifth Annual Conference on the Operation of Public Utility Motor Vehicles will be held concurrently with that of the Distribution Conference at the Stevens Hotel, Chicago, April 4, 5, 6, 1945. The officers of the committee are: S. G. Page, chairman, Equitable Auto Company, Pittsburgh, Pa. and B. D. Connor, vice-chairman, Boston Consolidated Gas Company, Boston, Mass.

Joint Production and Chemical Committee Conference

The Eighteenth Annual Joint Conference of the Production and Chemical Committees, sponsored by the Technical Section, and the Manufactured Gas Department, of which E. J. Boothby, Washington Gas Light Company, Washington, D. C., vice-president of the Association, is chairman, will be held at the Hotel Pennsylvania, New York, N. Y., Monday, Tuesday, and Wednesday, June 4, 5, 6, 1945. The committee officers are: Gas Production Committee—R. Van Vliet, New York and Richmond Gas Company, Stapleton, S. I., N. Y., chairman; and Samuel Green, The Brooklyn Union Gas Company, Brooklyn, N. Y., vice-chairman, Chemical Committee—Dr. C. W. Wilson, Consolidated Gas Electric Light and Power Company of Baltimore, Baltimore, Md., chairman, and W. R. Fraser, Michigan Consolidated Gas Company, Detroit, Michigan, vice-chairman.

Personal and Otherwise

Warsaw Succeeds Van Horn as President

LUZERNE County Gas and Electric Corporation on Dec. 18 announced the retirement, at his request, of R. R. Van Horn as president of the company. Charles E. Warsaw was elected to succeed Mr. Van Horn, effective December 31, 1944.

Mr. Warsaw, who now becomes president, has been vice-president and general manager since April 1944. He joined the corporation as superintendent of the electrical department in 1923, following employment in gas and electric subsidiaries with The American Gas Company dating back to 1917.

Mr. Van Horn will continue as a member of the board of directors of the company. He has been associated with Luzerne County Gas and Electric Corporation or its predecessor companies for more than 45 years.

Major Apmann Completes Special Mission

Major Apmann

MAJOR A. M. APMANN, formerly new business manager of the Derby Gas and Electric Co., Derby, Conn., recently returned from a special military mission abroad during which he visited the British Commercial Gas Association and several combat units in forward areas. He holds campaign stars for participation in the Northern France and Belgium-Germany campaigns.

While in Paris, Major Apmann discussed the immediate production problems facing French utilities. He also made a firsthand study of the cooperative campaign to conserve fuel in England and indicated that he was much impressed with this activity. During his stay in England he saw preparations for home service demonstrations stressing the cooking and canning of fruits and vegetables by the most economical methods.

Honored for Saving Boy's Life

VERNON A. HUNT, gas fitter for the Consolidated Gas Electric Light and Power Company of Baltimore, was singularly honored recently when he received a McCarter medal and certificate for performing an outstanding act of life saving. H. R. Cook, Jr., vice-president, made the presentation in the presence of the entire personnel of the fitting department, and paid tribute to Mr. Hunt.

The award was made in recognition of Mr. Hunt's work in reviving a 16-year-old boy who had been overcome by gas.

The McCarter medal is awarded by the American Gas Association to employees of companies who successfully apply the prone pressure method of resuscitation to victims of gas asphyxiation.

Lefferson Heads A. G. A. Rate Committee

L. R. Lefferson.

APPOINTMENT of L. R. Lefferson, head of the Rate Department of Ebasco Services Inc., New York, N. Y., as chairman of the Rate Committee of the American Gas Association has been announced by J French Robinson, president of the Association.

An outstanding authority in the field of rate engineering, Mr. Lefferson has an extensive background of operating experience as well as participation in Association committee work. He served as a member of the A. G. A. Rate Fundamentals Committee until it was discontinued in 1935 and, since 1939, has been a member of the Rate Committee.

Mr. Lefferson was associated from 1915 to 1918 with one of the utilities which later merged to form the Pennsylvania Power & Light Company. He joined the staff of the Electric Bond and Share Company as a rate engineer on April 1, 1918. He became assistant Rate Department head in 1926 and head of the department in 1933, retaining that position when Ebasco Services Inc. was formed in 1935.

The Rate Committee is composed of rate and valuation experts who meet regularly to consider developments affecting utility rates and related matters. From time to time the committee has issued valuable reports on gas industry matters.

Walker New Head of Bond and Share

MAJOR changes in the executive personnel of the Electric Bond and Share Company and its subsidiary, the American and Foreign Power Company, Inc., were announced recently.

Curtis E. Calder, president of American and Foreign Power, resigned that post to become chairman of Bond and Share, and George G. Walker, formerly vice-president of Bond and Share, was elected president of the company, one of the largest public utility enterprises in the country. Mr. Walker succeeds Samuel W. Murphy, who died recently.

C. E. Groesbeck, formerly chairman of Bond and Share, takes the new post of chairman of the company's executive committee. Lester B. Wiegers, secretary and treasurer of Bond and Share, was elected vice-president of the company, and B. M. Betsch, was named assistant secretary-treasurer. W. S. Robertson, vice-president and a director of American and Foreign Power, was elected president of the company to succeed Mr. Calder.

Ferguson to Direct Gas Association

JOHN A. FERGUSON, a member of the Missouri Public Service Commission for nine years, has been appointed executive director of the Independent Natural Gas Association of America, E. Buddrus of Chicago, president of the association, announced December 20.

After January 1, 1945, Mr. Ferguson will open offices for the association in Washington, D. C., Mr. Buddrus said.

Association Head

HUGH C. THUERK, president of the New Jersey Power & Light Company, was chosen president of the New Jersey Utilities Association at the group's 29th annual convention at Seaview Country Club, Atlantic City.

Howard B. Allen, vice-president and general manager of the New Jersey Power & Light Company, was elected a member of the executive committee.

More than 150 executives of electric, gas, phone and water companies attended.

Beebee and Ginna Made Vice-Presidents

A. M. Beebee

R. E. Ginna

AS this issue of the MONTHLY goes to press, announcement has been received of the promotion of two leaders of the gas industry's postwar planning program.

A. M. Beebee, chairman of the American Gas Association's Postwar Planning Committee, has been advanced from general superintendent of the gas department of the Rochester Gas and Electric Corp., Rochester, N. Y., to vice-president of the company.

R. E. Ginna, chairman of the A. G. A. Postwar subcommittee studying electric industry competition, and assistant to the president of the Rochester utility, also has been named a vice-president.

Both men have been prominent in Association affairs for many years and have made many outstanding contributions to the advancement of the industry.

Heads Stone & Webster

RUSSELL T. BRANCH, formerly executive vice-president of Stone & Webster Engineering Corporation, was elected president of the company December 20, succeeding John R. Lotz, who was elected chairman.

Luis Hilt Joins E. Holley Poe

LUIS HILT, librarian of the American Gas Association, resigned January 1 to join the consulting organization of E. Holley Poe. A member of the A. G. A. staff for more than 20 years Mr. Hilt had built up the Association's library until it ranks as the most complete gas technical information center in the country. He also set up and supervised the central filing system which has been in effect for many years.

In addition to answering thousands of inquiries from gas industry members throughout the world, he has prepared many valuable bibliographies, some of which have appeared in the MONTHLY. He is now engaged in bringing up-to-date the Index to Material of a Chemical Nature in the Association's Proceedings and certain Technical Section publications.

Prior to his affiliation with the A. G. A., Mr. Hilt was employed as private secretary in several New York firms. He is a graduate of Heffley Business Institute of Brooklyn.

After a farewell luncheon in his honor, Mr. Hilt received a wrist watch as a token of regard from the Association's staff.

Mid-Southeastern Elects Rider

J. S. RIDER, Consolidated Utilities Corp., Sumter, S. C., was elected president of the Mid-Southeastern Gas Association at its annual convention in Raleigh, N. C., November 17. He succeeds E. J. Meade.

Other officers named were A. E. Jones, Wilmington, first vice-president; C. B. Zeigler, Gastonia, second vice-president and E. W. Ruggles, Raleigh, secretary-treasurer.

Directors elected were Martin Swartz, Greenville, N. C.; J. R. A. Hobson, Jr., Richmond, Va.; T. W. Yarborough, Winston-Salem; A. T. Carper, Raleigh; M. E. Shea, Roanoke, Va., and Frank Tony, Charlotte.

Mrs. Simmons Directs Home Service

MRS. WINNELL SIMMONS has been appointed home service director of the Houston Natural Gas Corporation.

A graduate in home economics from the Texas State College for Women, Mrs. Simmons was employed from 1941 to 1944 as home economist for the Lone Star Gas Company, Dallas. She resigned from Lone Star last September just prior to her marriage to Frank C. Simmons, chief petty officer in the U.S.N.R.

Mockel Rejoins Servel

EDWARD B. MOCKEL has rejoined the sales promotion department of Servel Inc., Evansville, Ind., after a two-year leave of absence.

Before the leave of absence, during which time Mr. Mockel was an expediter for Henry J. Kaiser Inc., shipbuilders in Providence, R. I., he was sales promotion representative for Servel's New England district.

Mr. Mockel's home is in Arlington, Mass., and he attended Columbia University.

Carson Heads Committee

R. H. HARGROVE, chairman, Natural Gas Department and vice-president, A. G. A., has announced changes in the personnel of the Transmission Committee. H. J. Carson, Northern Natural Gas Company of Omaha, has been made chairman and R. G. Strong, Natural Gas Pipeline Company of America of Chicago, has been added to membership.

E. V. Kesinger, Natural Gas Pipeline Company of America, the retiring chairman, will continue his extensive work in other activities of the Natural Gas Department.

Edge Resigns Position With Houston Natural

E. E. "BUDDY" EDGE, associated with Houston Natural Gas Corp. for many years as an appliance salesman and more recently as service consultant and supervisor in charge of meter reading, has tendered his resignation to become effective Jan. 1, 1945, at which time he will enter the employ of the A. O. Smith Corporation.

Rosser Thomas, Jr., public office manager, will assume the responsibilities handled by Mr. Edge as service consultant, while Clem Sherrill will undertake full supervision of the meter readers and the routing of their work.

Miss Cowing to Marry Capt. Schauer

Frances Cowing.

FRANCES COWING, former acting director of home economics for Servel Inc., has resigned to be married to Capt. Louis A. Schauer, Army Air Forces.

Before the war Capt. Schauer was associated with the Milwaukee Gas Light Company in the refrigeration sales division.

Miss Cowing, a 1939 graduate of the University of Illinois, has been a member of the home economics department of Servel for five years. During this time she has been a member of the American Home Economics Association, Home Economics Women in Business, and the American Association of University Women. She has served as a member of the Home Service Committee of the American Gas Association in both 1943 and 1944, and as a member of the 1944 Home Service Committee of the Southern Gas Association.

Dixon Named

APPOINTMENT of Fred W. Dixon, Jr. as sales manager of the Cleveland Foundry Company has been announced by Homer Britton, vice-president and general manager of that company.

BUREAU OF MINES HONORS EILERTS FOR LABORATORY ACHIEVEMENT

C. Kenneth Eilerts

C. KENNETH EILERTS, veteran physical chemist at the bureau of Mines Experimental Station, Bartlesville, Okla., was signally honored in December when he received an award of excellence from Interior Secretary Harold L. Ickes. In addition to the award, he was given a substantial increase in salary.

This recognition was accorded Mr. Eilerts for his "ingenuity and diligence" in two-years' work on the construction of a portable laboratory for measuring properties of fluids for gas-condensates. The laboratory and its function were described by Mr. Eilerts in an article in the April 1944 issue of the A. G. A. MONTHLY. The American Gas Association's Natural Gas Department cooperated with the Bureau in the use of this unique equipment which was designed to test the characteristics of the gas and liquid contents of natural, deep-seated petroleum deposits known as gas-condensate reservoirs.

The award was presented by N. A. C. Smith, superintendent of the Bureau's Bartlesville station, at an impressive ceremony attended by more than 100 co-workers. Harry C. Fowler, assistant chief of the petroleum and natural gas division of the Bureau in Washington, was present and paid high tribute to Mr. Eilerts' work. Letters of commendation were received from Secretary Ickes and Bureau of Mines' Director R. R. Sayers.

A native Oklahoman, Mr. Eilerts is a graduate in chemistry of the Oklahoma A. and M. College.

SCRAMBLING MAGIC, COOKERY AND GAS

IT was inevitable. Gas cookery and magic have been associated so frequently that, sooner or later, someone *had* to combine the two in a cooking demonstration. Kathleen Conrad, of the Minneapolis Gas Light Company's home service staff, is the "Houdini of the Kitchen" who does this neat trick. But let her tell the story:

"Magic and cookery are two words that have gone together sort of hand in hand, so I decided to combine my hobby and my profession.

"During the theater schools, I tried to use a trick that would tie in with the particular demonstration I was giving or with gas cookery in general. At one of the sessions we were stressing 'Clean Your Plate' and I did a trick which carried through this idea. I took a plate with bits of foods left on, showed how the American people are apt to think cleaning their plates means to just use a rubber scraper and empty into the garbage can. Then I put the cover on my 'garbage can,' touched with the wand and produced many colorful spring flowers, saying we should eat every bit of food on our plates and with the extra energy, produce Victory Gardens.

"Another day I showed how our Grandma used to bake by putting a pinch of this and a bit of that into a bowl. I stirred all together and held the mixture over the gas flame explaining how gas really does wonders with the mixtures we give it to finish. When I removed the cover, a white dove flew out. I said that every woman could do magic in her kitchen providing she used a gas range.

"In one demonstration I stressed the importance of buying War Bonds now for that modern gas range of the future. This was done with a trick in which I produced war bonds at the end.

"I began a canning demonstration this year by rolling together various colored papers, tearing and producing 'corn' and a 'ladder' from the Victory Garden, the ladder being used to climb up and get the tall corn. The demonstration was ended with a trick in which I produced colored silks from an 'empty' tambourine —explaining that each one represented one of the foods necessary in our diet. For example—the yellow one was for our milk, cream, eggs and dairy products, the green one for all green leafy vegetables, the red for red meat etc. After the silk, ticker tape is pulled out and a rabbit is produced at the end. The 'guy' we keep out of our Victory gardens."

The only trouble with doing magic in connection with demonstrations is that when we ask for suggestions for improvements, they say—"More Magic" instead of more cooking ideas.

Kathleen Conrad doing tricks of magic.

Eastern Vice-President

James W. Tyson, II

ELECTION of James W. Tyson, II, as vice-president of Eastern Gas and Fuel Associates, Boston, was announced December 18. Mr. Tyson in 1934 became assistant treasurer of Koppers Coal Company, later the Koppers Coal Division of Eastern Gas and Fuel Associates. He will continue to make his headquarters in Pittsburgh.

Schilling Joins A. G. A.

WILLIAM M. SCHILLING of New Brunswick, N. J., has been appointed assistant engineer of utilization of the American Gas Association, effective January 1, 1945, it was announced by J French Robinson, president of the Association. His first major assignment will be to assist C. George Segeler, engineer of utilization, in the editing and preparation of a Manual on Food Service which is to be made available to commercial gas salesmen and others.

A graduate chemist from Rutgers University, class of 1942, Mr. Schilling was previously employed as chemical engineer for the Bakelite Corporation, Bound Brook, N. J., where he worked in the pilot plant and production department.

Mueller Re-elected

H. P. MUELLER, president of the L. J. Mueller Furnace Co., Milwaukee, was re-elected president of the National Warm Air Heating and Air Conditioning Association at the thirty-first annual convention of that organization, held Dec. 13-14 in Cleveland. All other officers and directors whose terms expired were also re-elected.

Home Service Award Winner

Miss M. Thelma Bly, district home service director, Fond du Lac, Wisconsin, receiving third prize in the nationwide McCall's Home Service Contest from Grover C. Neff, president of Wisconsin Power and Light Company. A war bond and plaque were the prizes in the contest conducted by the American Gas Association.

Talks on Ceramic Kilns

AT the December 15 meeting of New Jersey Ceramic Society held at Rutgers University, New Brunswick, N. J., Emil Blaha, manager of ceramic division, Selas Corporation of America, gave an interesting talk on high temperature gas ceramic kilns. Mr. Blaha used the continuous rotary direct-fired bisque kiln which was developed under the sponsorship of A. G. A. Committee on Industrial Gas Research in conjunction with the Lenox Potteries, Trenton, N. J., as the basis for his talk.

A.S.T.M. Standards on Petroleum Products

THE American Society for Testing Materials recently published a book of "Standards on Petroleum Products and Lubricants" compiled by its D-2 Committee. This latest compilation of all A.S.T.M. specifications, methods of tests, and definitions pertaining to petroleum products includes the some 80 standards which with certain supplementary material comprises more than 500 pages.

The large number of test methods provide authoritative procedures for determining properties of a wide range of petroleum products, for example, acid heat of gasoline, aniline point, burning quality of various products, carbon residue, color, distillation, specific gravity, knock characteristics of fuels, melting point, etc.

Specifications are included covering fuel oils and gasoline, Stoddard solvent, various types of asphalt, etc.

This book, which includes the emergency method of test for color of Army motor fuel, and certain emergency provisions, can be obtained from A.S.T.M. Headquarters, 260 S. Broad St., Philadelphia 2, Pa., at $2.75 each, with reduced prices on orders in quantity.

Among the 91 members of Committee D-2 on Petroleum Products and Lubricants is F. W. Fulweiler, well known consulting gas engineer and member of the A. G. A. Technical Section.

Obituary

ARTHUR P. HIROSE

ARTHUR P. HIROSE, who resigned last October 15 as director of promotion and market research for McCall Corporation to become affiliated with *Newsweek* in the same capacity, died of pneumonia in December.

A nationally recognized market research expert, Mr. Hirose had appeared on many gas industry programs and was widely known in utility circles. Until his recent change of positions, he had been connected with the McCall organization for the past ten years. Mr. Hirose was a member of the Promotion Advisory Committee of the Magazine Advertising Bureau, a member of the Marketing Committee of C. E. D. and research coordinator of the War Advertising Council.

In 1941, Mr. Hirose won the Research Medal in the Annual Advertising Awards (formerly the Bok-Harvard Awards) for a study of the gas appliance market. During 1942 he served as consultant to the Office of Price Administration in Washington.

PAUL M. DOWNING

PAUL M. DOWNING, executive vice-president of the Pacific Gas and Electric Company, San Francisco, who played an important role in the concern's expansion, died Dec. 11 after an illness which had been recurring for two years. He was 71 years old.

A member of the first graduating class at Stanford University, Mr. Downing played football for four years, being captain of the team during his senior year, when former President Hoover, a classmate, was manager.

Born in Newark, Mo., Mr. Downing entered Stanford the day it opened, Oct. 1, 1891. After graduation he became a dynamo tender in the generating plant of the Tacoma (Wash.) Light and Power Company. Returning to California, he was associated with several concerns before becoming manager in 1900 of the Colusa Gas and Electric Company, later a part of the P. G. & E. System.

Three years before he accepted this last position he had served as station superintendent of the Blue Lakes powerhouse of the Blue Lakes Water Company, also a later factor in the P. G. & E. System. By 1920, fifteen years after the P. G. & E. Company was incorporated, Mr. Downing was its vice-president in charge of electrical construction and operations. For fourteen years before becoming executive vice-president last August, he was first vice-president and general manager.

One of his latest accomplishments was the completion of Pit 5 hydroelectric generating station in Shasta County, California's largest hydroelectric installation.

Mr. Downing was a past vice-president of the American Institute of Electrical Engineers, a past president of the Pacific Coast Electrical Association and a member of the Pacific Union, Olympic and San Francisco Golfs.

He leaves a widow, the former Frances Stevenson, and a daughter, Mrs. Hector Keesling.

ROBERT W. WIEDERWAX

ROBERT WALTON WIEDERWAX, president of the Atlantic City Gas Co., Atlantic City, N. J., died December 6. He had been employed by the company, a Public Service subsidiary, since 1907.

CHARLES A. PEPPER

CHARLES A. PEPPER, assistant manager of the Wisconsin Public Service Corp., Sheboygan, Wisc., for the past 20 years, died November 22.

His 44-year service record began on April 15, 1901 when he became a helper in the service department of what is now the Wisconsin Public Service Corporation. He was promoted in 1908 to foreman of the department and in 1916 was transferred to the sales department and made sales manager. His promotion to assistant manager of the corporation occurred in January, 1924.

Throughout his years with the corporation he was popular among both employees and customers.

GAS INSTITUTE RESEARCH

(Continued from page 8)

bers approximately 60 and the space available for its operations was doubled during 1944. Additional space is being made available for the Gas Production Research Program, and, despite the difficulties of war time operations, the work will go forward as rapidly as possible.

The Institute enters 1945 with 62 member companies and 15 other companies which have been regular contributors to its support. It hopes during this year to add greatly to its membership, so that it will be able to render to the gas industry the services which its founders envisioned.

TRAINING PROGRAM

(Continued from page 18)

As an illustration of how analysis was featured in refrigeration servicing procedures, eight different operative refrigerators were used to simulate eight different typical conditions during the 1944 series. Most of the problems were related to customer mis-use or misunderstanding of the appliance. In order to simulate actual home conditions, artificial food was used to pack the shelves with fruits, meats and beverages, etc., normally found in the refrigerator. The servicemen were then given a set of instructions containing the symptoms as they would be explained by the housewife. They then proceeded to analyze the problem on the basis of the symptoms and informed the instructor of their analyses.

During that 1944 series, a portion of the time was devoted to a "preview" of the Servel Air Conditioner. A five-ton unit, installed in the classroom, was explained by an industrial engineer. The objective in discussing this relatively new development was not to equip the domestic servicemen to service this appliance, but rather to prepare them to intelligently discuss the air conditioner with the customers when questioned about it on routine service calls. Thus, in anticipation of the day when these air conditioning units will be installed in great number, the domestic servicemen will at least be qualified to light the appliance and put it into operation.

As a result of training, the refrigeration "specialist" of yester-year whose "magic touch" was required to service refrigerators has been replaced by the present-day operating servicemen who service refrigerators as a matter of routine. Not only have all operating servicemen been qualified to service refrigerators, but recent surveys of their effectiveness indicate that the refrigerators are actually less bothersome from the service standpoint than some of the other more common and simple appliances.

Dealer Training

In keeping with the company's policy of cooperating with plumbers and dealers and other service organizations, considerable time has been spent in training their personnel in the correct procedure used in servicing gas appliances. As a result of this training, certain groups within company operating territory have been qualified to install and service all types of gas appliances.

The large increase of population in Southern California has resulted in the erection of several large Federal housing units in which gas appliances were specified. Those appliances were sold directly to the contractor and, therefore, did not go through a dealer's warehouse where appliances are usually serviced prior to installation. Initially, the service personnel of those housing units were having difficulty in putting those appliances into satisfactory operation, with consequent numerous service calls being received by the company. Classes were therefore held for the maintenance people of the housing group, in which the proper servicing procedures were thoroughly discussed and demonstrated. Following this, the service calls for the Federal housing units dropped sharply, much of which improvement may be attributed to the resultant better qualified maintenance personnel.

Mr. Therm: And I go with the house.

[Cartoon by Wallace Coop

—London *Gas World*, August 5, 1944.

Three Viewpoints

Through research and precision manufacturing methods, the gas appliance manufacturer has built into his product more speed, satisfaction and efficiency than ever before. Yet, much of this merit can be cancelled out by improper installation and adjustment when the appliance is first put into service.

The dealer, too, although handling quality merchandise, finds himself interested in the proper installation and initial adjustment of an appliance which can keep his salesman's promises—if given the chance.

And, finally, the utility has an active interest in the degree of satisfaction its customers' experience. It is well aware of its responsibility of providing a dependable supply of uniform quality gas, at a constant pressure, but it also knows that the proper utilization of this gas depends on how good the customer's equipment is, and how well it is installed and serviced.

The training effort of the Southern California Gas Company, which has been directed toward those who render customer service, is in recognition of the belief that customer satisfaction is the result of a well-manufactured product—properly installed and properly serviced. From the customer's viewpoint, there can be no compromise.

GAS INDUSTRY IN 1944

(Continued from page 6)

this goal, for upon the industrial gas furnaces, ovens, melters, and similar equipment rest the superior performance and quality of American war equipment.

Home Service Activities

During the year, the Home Service Division of the gas industry continued its active promotion of the wartime programs of nutrition and food conservation. In thousands of towns and cities in the United States and Canada, Government programs of food, fuel and appliance conservation have been explained through demonstrations, information centers and home calls. In recognition of this effort the War Food Administration recently paid tribute in letters to gas companies, expressing appreciation for the support given the wartime food programs.

Approximately twelve million customer contacts were made during the year by Home Service personnel. Special attention has been devoted to "Programs for Young America," designed to meet the special needs of young people who have been shouldered with the home responsibilities of food choices, marketing and preparation.

In the summer of 1944, customer contacts in food preservation totaled six million, requiring the preparation and distribution of two million canning booklets. From contacts made at demonstrations and lectures, telephone calls and personal conferences in local offices and at canning centers, it is estimated that millions of quarts of food have been preserved under the supervision of Home Service Departments of the gas utility companies, thus aiding substantially the cause of national wartime food conservation.

The gas industry has operated at high efficiency within the limits of numerous governmental restrictions and has accepted and successfully discharged its responsibility for the conservation of critical resources.

WATER HEATER SIZING

(Continued from page 21)

burners in one heater. No improvements in service efficiency over that attained originally by the same heater with a single burner at minimum input rate for a given daily draw was obtained. Likewise no reduction in standby loss was effected by this arrangement.

Substitution in another heater of a power burner for the atmospheric burner with which it was originally equipped showed an increase in thermal efficiency from 72.4 to 82.9 per cent. Service efficiency likewise increased from 52.6 to 66.2 per cent. Standby losses indicated improvement by dropping from 7.07 to 3.87 per cent per hour. This was accomplished without reducing flue gas temperature below the practical limit of 372° F. Reduction of excess air to approximately 5 per cent from the usual 75 to 150 per cent accounted for the improved performance. While the improvement attained could be equalled with the use of an atmospheric type burner injecting 100 per cent primary air, it may not be possible to accomplish it without increasing ordinary manifold gas pressures.

In corroborating previous theoretical findings of the importance of the size-rate ratio to overall operating economy, the study furnishes an excellent contribution towards a more critical examination of the technique of modern gas appliance installations. Its practical nature not only is of immediate value in such instances where hot water requirements can be determined within reasonable bounds, but it also provides the gas industry with concrete practical data on which further research and development can be intelligently based both as to underlying design problems and installation procedure. It fits admirably into a growing interest in water heating as an important factor of load building and likewise lays the foundation for a clear-cut scientific analysis of competing fuels.

Personnel Service

POSITIONS OPEN

Engineering graduate, fifteen years of broad experience in design, construction and operation of gas plants and distribution systems desires connection as **superintendent** or **manager** of medium size property. Available shortly after the first of the year (37). **1485.**

Manager with broad training and experience in the operation and management of gas properties, well grounded in the manufacture of carburetted water gas and both high and low pressure distribution. Experience also includes sales and commercial activities. College graduate with technical degree. **1486.**

Operating Executive seeks return to gas industry from U. S. assignment on war contracts negotiations. Good educational background; have engineering and legal degrees and broad experience in all branches of the manufactured and natural gas phases of the industry. **1487.**

SERVICES OFFERED

Test Engineers; Research Engineers: Design and product development engineers for gas cooking appliances. Previous experience desirable but not necessary. Technical education essential. **0404.**

Manager for water gas plant, send-out about 400 M medium pressure; location South Carolina. State experience, education, reference and salary expected. **0405.**

Operating Superintendent thorough knowledge of water gas. Important city of 20,000 location south. Give experience reference and salary expected. **0406.**

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